

Application of the Theory of Planned
Behaviour to explain adult male
anabolic androgenic steroid use among
gym users

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Thesis Abstract

Background and aims: In the UK, the illegal use of anabolic androgenic steroids (steroids) among recreational gym-users has been increasing alongside a growth in the number of steroid-users accessing harm reduction services. Steroid-misuse has therefore become a public health concern. This study explored first-hand experiences of steroid-users' attitudes towards and motivations for using steroids. It also explored whether and how societal and individual pressures as well as barriers and facilitators influence steroid-users' decisions to use steroids. One key aim was to develop a Theory of Planned Behaviour (TPB; Ajzen, 1988; 1991) questionnaire. This study also examined the application of TPB variables (attitudes, subjective norms, perceived-behavioural-control and their respective underlying beliefs) to account for the variations in intention to use steroids. Finally, the study explored the differences between steroid-users and non-steroid-users in terms of the TPB variables (i.e., differences in explanation of actual past or current behaviour, and predictions of future intentions within a steroid-user group), as well as their underlying beliefs towards steroids.

Methodology: This study used a cross-sectional mixed methodology (exploratory sequential design). The study utilised the TPB theoretical framework and consisted of two phases: (I) A qualitative exploration of steroid-use, leading to the development of a TPB questionnaire and (II) The use of the developed TPB questionnaire to investigate participants' future intentions concerning steroid-use or non-use. 188 adult male recreational gym-users (113 steroid-users and 75 non-steroid-users) participated in this study. Participants were recruited from various online social media (e.g., Facebook, bodybuilding forums) and from Addaction within Lincolnshire, where paper copies of the questionnaire were available.

Results: Findings from phase one led to the development of the TPB questionnaire as well as providing novel insights to explain reasons for steroid-use (e.g., reduced natural testosterone levels, self-protection) accounted for outside the TPB framework. During phase two, hierarchical multiple regression revealed that a positive attitude towards steroid-use among users is the most

important contributing factor for explaining future intentions to use the drug. Findings from the two individual logistic regressions and between group comparisons highlighted that steroid-users' attitudes towards steroid-use and perceived-behavioural-control (i.e., a higher level of positive control and factors that enabled steroid-use) were higher than non-users. Non-users' normative beliefs (i.e., a perceived increase in negative social pressure and disapproval from significant others) were higher than users. Conversely, users perceived a positive outcome of steroid-use whereas non-steroid-users perceived an increased negative outcome of steroid-use for behavioural beliefs. Finally, independent *t*-tests identified particular beliefs and factors that the groups differed on (e.g., non-users mostly reported unfavourable consequences of steroid-use).

Conclusions: This study provides evidence that the application of the TPB can be useful in understanding an individual's future intentions concerning steroid-use or non-use. The TPB could be used in future research as a template for the development of harm reduction, awareness and education programmes. Furthermore, it may be applied within clinical practice by supporting healthcare professionals to develop specific interventions to target the TPB variables in order to help reduce the use of the drug.

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Statement of Contribution

I, Harry Ager, Trainee Clinical Psychologist, would like to thank Dr Nima Golijani-Moghaddam for his contribution with conceptualising the design for this research project and supporting me with the interpretation of findings and statistical analyses. I can confirm that I sought and obtained the relevant ethical approval during different phases of this study, reviewed the literature pertaining to this research area and was responsible for participant recruitment, conducting all of the data collection, scoring of questionnaires, data entry and analyses and the wrote this thesis. Dr Nima Golijani-Moghaddam and Dr Roshan das Nair, contributed to reviewing the study progress routinely, during the development of the Theory of Planned Behaviour questionnaire and reviewing the draft of the Journal Paper. A special thanks goes to Dr Nima Golijani-Moghaddam, who offered feedback on the writing style and structure within the extended methodology, results and discussion chapters.

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Systematic Literature Review

Psychosocial factors associated with male adolescent gym users'
anabolic androgenic steroid use:

A systematic review¹

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Abstract

Background: Anabolic androgenic steroids (steroids) are associated with psychological and physical health-related problems, and are an increasing problem among male adolescent recreational gym users.

Aims: This review examined the psychosocial factors predicting use in male adolescent users, and the Theory of Planned Behaviour (TPB) conceptualised these factors within a psychological model. Differences between adolescent users and non-users were also examined.

Method: A systematic approach identified seven relevant studies via electronic databases and hand-searching bibliographies of reference lists.

Results: Emergent themes conceptualised with the TBP concluded that the main reasons offered for adolescents' use of steroids was to improve appearance and their physique, build up their strength and muscle size, and improve sporting performance. Steroid-users indicated a general lack of knowledge of the potential harmful effects of these drugs when compared with non-steroid-users. Steroid-users had been influenced to use the drug by their peers, and obtained the drug from a variety of sources.

Conclusion: The TPB illustrated a strong relationship between psychosocial factors influencing male adolescents to use steroids. There were also strong differences between the users' attitudes about the potential benefits and side effects associated with its use when compared with non-users. Further research into this distinct population is timely as prevalence rates are increasing among even younger adolescents and expanding on an international level. TPB could be used in future research to provide a template when developing prevention programmes to reduce the use of the drug among adolescent males.

Keywords: Adolescent, male, anabolic androgenic steroids, psychosocial.

Introduction

Anabolic androgenic steroids² are synthetic derivatives of testosterone and enhance sporting performance by increasing muscle size, strength and lean body mass, with or without exercise (1). Male elite athletes have increasingly used them since the 1950s for highly competitive sports at both international and national levels and are now banned by all major sporting bodies (2). Moving away from athletes, steroids have traditionally been associated with weightlifting (3), bodybuilding (4), non-competing athletes (5), fitness centres and gyms, and has filtered through into professional sports teams. It has extended further beyond these sporting arenas to reach adolescences within the educational system and into their sports clubs (6-7), which is becoming more of a public health concern.

Adolescence describes an individual's transition stage between childhood and adulthood, however, there is no universally agreed age range and it is often arbitrarily set by different researchers (8). However, the World Health Organisation (9) has defined the adolescent age range from 10-19 years old.

During the 1980s, prevalence rates of male adolescent steroid-users was investigated in North America (10), with some researchers suggesting that between 250,000 and 500,000 adolescents in the USA use steroids (11). More recently, other studies have reported prevalence rates between 1.9 to 11 per cent in boys and has been reported continuously ever since (12-14), with some steroid-users starting as young as eight years old (10). Research conducted in Canada highlighted that 2.8 per cent of 11-18 year old adolescents had already taken steroids (15), however, the prevalence rates for school girls in the USA and Canada are considerably lower, ranging from 1 to 2 per cent (16). The high prevalence rates of steroid use have become an international problem (17), but the majority of studies have been conducted in the USA, with only a minority of studies from Canada (18), Sweden (19), South Africa (20), Australia (21), and Great Britain (22).

² This term will be shortened to Steroid(s) for the rest of the paper.

The majority of steroid-users are non-athletes and non-competitive recreational bodybuilders who aim to improve their appearance for psychosocial reasons, rather than improve their sporting performance (23). Psychosocial factors include: an individual's attitude towards the use of steroids, which is based on the benefits and risks associated with its use (e.g., to improve appearance and physique, built up strength and muscle size, and improve sporting performance), including pressures to use the drug from significant others (e.g., friends), and from the media.

The increasing prevalence rates of steroid use are a major health risk and concern, associated with harmful physiological and psychological effects (24). Physiological effects can include: acute acne, kidney and liver damage, gynecomastia (breast development), and impotence (25). Psychological effects include: mood disorders, aggressiveness, drug abuse and dependence (26). Furthermore, evidence suggests that adolescent steroid-users are more likely to use other drugs (27), share needles (28), and potentially increase the spread of the human immunodeficiency virus (HIV) and the risk of transmitting hepatitis and HIV infection (29). The literature indicates that adolescent steroid-users have a general lack of knowledge or are in denial about the associated risks involved with steroid-use as non-steroid-users are able to identified more health risks (10).

Rationale for Review

Given the dearth of existing evidence about the adolescent male recreational bodybuilder, this review sought to compile available evidence to conceptualise the psychosocial factors that may influence steroid-use. It integrated the empirical evidence with Ajzen's (30) Theory of Planned Behaviour (TPB) model (see Figure 1), as it has been shown to be reliable when applied to comparable models of health behaviour (31). The model proposes that an individual's attitude towards behaviour is calculated with a cost and benefits analysis and/or the risks and rewards of carrying out the behaviour. Subjective norms relate to the social pressures and peer influence from significant others, and perceived-behavioural-control is an individual's understanding about their ability and power to act and carry out

the behaviour. These factors affect behavioural intentions (which is the precursor and predictor) of the actions to adopt or reject a healthy behaviour (30).

Currently, education and harm reduction programmes have been developed to promote alternatives (e.g., strength training techniques) and improve the attitude towards steroid-use and therefore discourage its use (32).

However, some have argued that these interventions start too late and need to target an even younger population (33). Therefore, there is a need to understand the initial acquisition of this behaviour. Examining the evidence from adolescent populations and conceptualising the empirical data in terms of the TPB may help to identify key variables and pathways and thereby inform design of both preventative and ameliorative interventions.

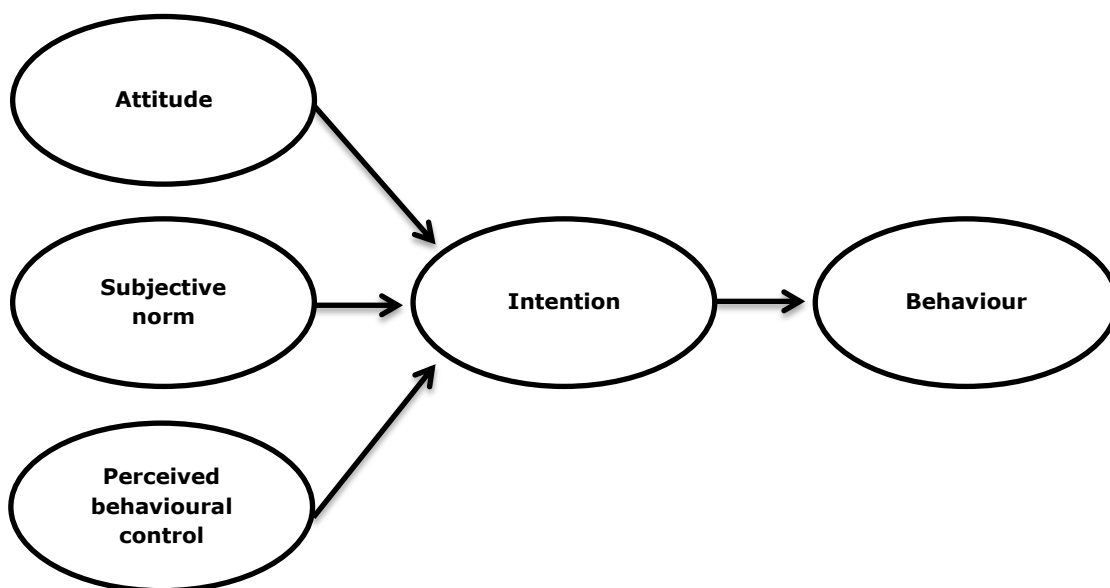


Figure 1 The Theory of Planned Behaviour (30)

Aims and Objectives

This systematic literature review aimed to conceptualise and discuss findings in terms of the TPB, thereby making an original contribution to the knowledge base. Thus, integrating an empirical literature base with an established theoretical model will provide scope to make sense of available data.

In systematically reviewing the most comprehensive evidence available, the objectives of this study were:

- To examine psychosocial factors as conceptualised by the TPB influencing steroid-use in male adolescent non-competitive recreational gym users.
- To examine the difference between adolescent steroid-users and non-steroid-users.

Method

Protocol

In preparation for the systematic literature review, the authors developed a protocol and conducted pilot searches by following the guidelines (34) from the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA). Following testing of preliminary search terms, a search strategy was developed.

Information Sources and Search Criteria

A summary of the literature selection process is provided in Figure 2 below. Searches were conducted on electronic social science and medical databases, including (with period covered): PsycINFO (1806 to December Week 2 2013), EMBASE (1974 to 2013 December 16), MEDLINE (R) (1946 to November Week 3 2013), and Allied and Complementary Medicine (AMED; 1985 to December 2013). Google Scholar was searched to identify any additional relevant papers. The following search strategy was used: ('adolescen*' OR 'teenager*' OR 'youth' OR 'juvenile' OR 'boy*' OR 'junior' OR 'male*') AND ('steroids' OR 'androgens' OR 'anabolic androgenic

steroids' OR 'anabolic agents' OR 'performance enhancing substance' OR 'performance enhancing drugs') AND ('psychosocial' OR 'attitude*' OR 'intention' OR 'belief*' OR 'social norms' OR 'subjective norm' OR 'self efficacy' OR 'perceived behavioral control'). The bibliographies of the full-text relevant papers that passed the eligibility criteria were hand-searched.

Inclusion and Exclusion Criteria

To ensure that the studies included within this systematic review were of the highest quality within the field of investigation, only peer-reviewed primary research was included. Theses, editorials, reviews, published letters, conferences, poster campaigns and books were excluded. We included quantitative studies that were published in English, with no restrictions being placed on the date of publication due to the limited amount of available papers were included. Studies that only used secondary data were not considered within this review. Only male adolescent non-competitive recreational gym users³ with a cut off age of 20 (based on the WHO categorisation of adolescence) were included in this review⁴. Studies were required to provide some information on psychosocial factors (e.g., attitudes, intention, beliefs, social influence peer pressure) towards using steroids.

³ Given the dearth of existing evidence about this specific population.

⁴ No limits regarding age were applied to the search strategy to ensure that mixed adolescent and adult studies were not excluded. However, to be included these mixed age studies needed to provide separate data for adults and below the age of 20 years-old.

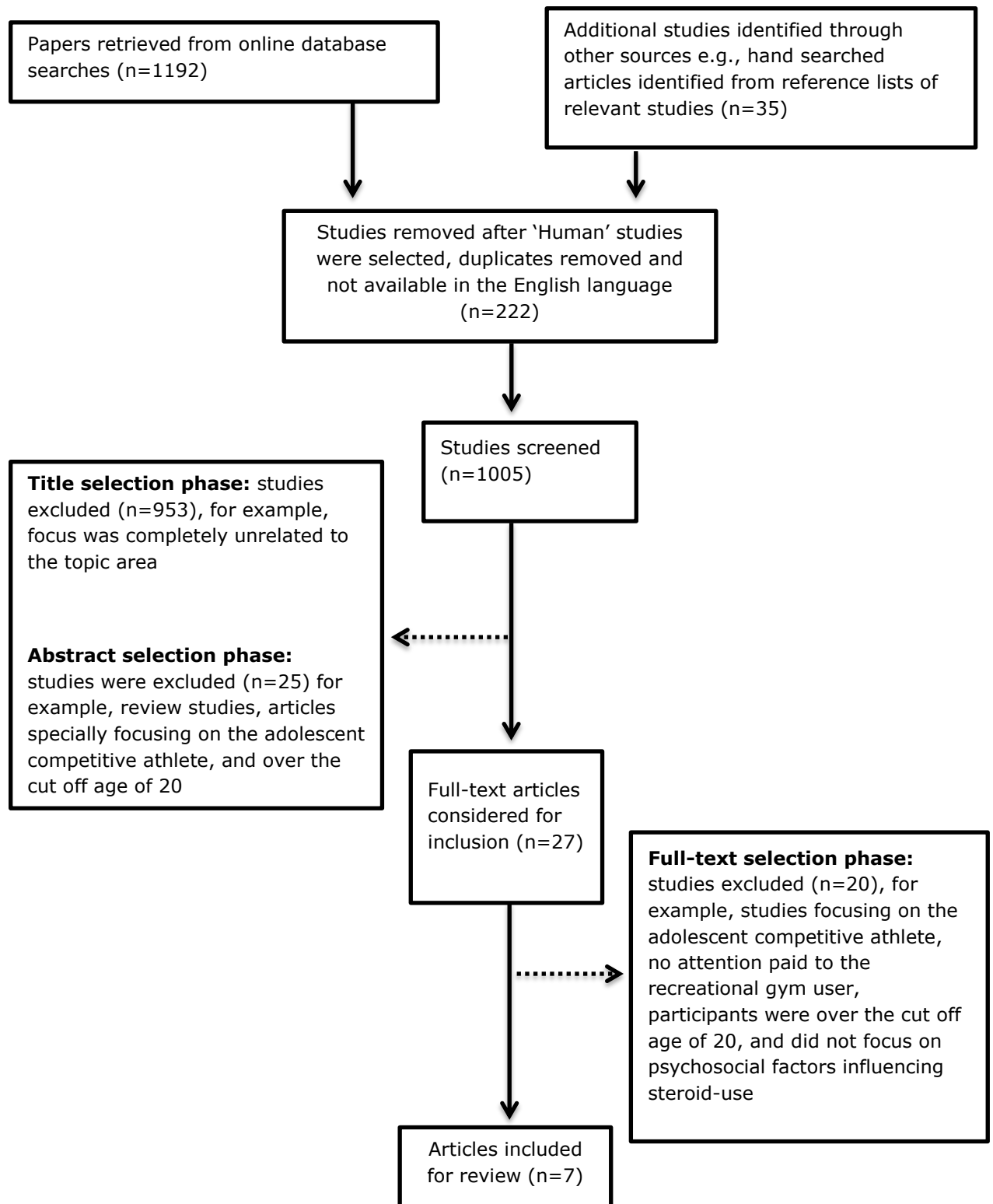


Figure 2 PRISMA diagram outlining the selection process

Study Selection

The search of the databases identified 1192 potential studies. Additionally, 35 studies were identified by searching the bibliographies for potentially relevant papers appropriate for this review. After limiting the search to 'Human' studies, removing duplicates, and those not available in the English language, 222 papers were excluded. A title screen of 1005 papers saw 52 papers remain and the abstracts of these papers were reviewed to ascertain inclusion. A total of 25 papers were removed, leaving 27 papers meeting the eligibility criteria for the full-text paper review. The inclusion and exclusion criteria was applied to these full-text papers resulting in the removal of a further 20 studies, leaving a total of seven studies that were included in this review.

Data Abstraction

The first author conducted data abstraction and the general characteristics, key findings and psychosocial factors obtained from all of the studies are tabulated in Tables 1-3.

Methodological Quality

Although, there are a variety of standardised assessments to assess the methodological quality of published research, controversies exist regarding their reliability and variability in the range of assessed quality when used for systematic reviews (35). In addition, the vast majority of quality assessments tools have been specifically designed to be applied to randomised control trials and therefore lose their creditability when applied to systematic reviews that are not limited to such trials. Therefore, for this review, quality was appraised by examining the methodological rigor of a range of study characteristics (e.g., sample used, methods of data collection and identifying limitations). We were guided by the Critical Appraisal Skills Programme (CASP) tool (36) for assessing the methodological characteristics, as outlined in Table 1. To address the heterogeneity of 'adolescence' we commented on whether studies specifically differentiated and compared across age groups. The general characteristics and key findings of the reviewed studies are presented in Table 2, and the

psychosocial characteristics of steroid-users conceptualised with the TPB are outlined in Table 3.

Results and Synthesis

Methodological Characteristics

All seven studies [1-7]⁵ were conducted over a 16-year period (1989-2005). The authors explicitly defined the term 'steroids' and investigated the prevalence rates and reasons for use among adolescents by using quantitative methodologies. They described the participants' demographics in sufficient detail for the purpose of this review (e.g., age and gender), and the participants were aware about the purpose of the study. However, the quality of the studies varied, as four [1-2,6-7] explicitly described the development and standardisation of the self-reported questionnaire, and three [3-5] not describing the development of the questionnaire. Other potential biases were apparent with the collection of information as one study [6] only collected information for one week's period. Another study [1] recorded lifetime use, which encapsulated individuals who had stopped using steroids and grouped them with current users, and these methods may have biased the findings. Additionally, one study [4] used a bilingual questionnaire and there may have been linguistic problems during the direct translation, including theoretical issues and questions of generalisability. Finally, only two studies [3,5] did not use a formal statistical analysis and used simple frequency counts and percentages instead.

The majority of research was conducted in the USA [3,5,6], followed by Sweden [1,2], with one study being conducted in South Africa [4] and Great Britain [7]; therefore, these findings may have limited generalisability to other cultures and societies. The sample size ranged from 466 to 4049, with a total of 14050 participants across all seven studies; with the representativeness of the sample (as defined below), ranging from good [1,2,4], to moderate [3,5,6], and to poor [7]. Four studies [2,3,6,7] compared steroid-users over a range of different ages (e.g., 9-19 year-olds)

⁵ [] This symbol corresponds to the study number.

with three studies [1,4,5] focusing on the same age category; however, no study gave any justifications why they had selected their particular age categories to investigate. Six [1-5,7] out of the seven studies compared steroid-users with non-steroid-users. Finally, all seven studies acknowledged the problems with self-reported measures leading to 'over and under reporting', however, only two studies [2,4] did not acknowledge any additional limitations of their research.

General Characteristics and Key Findings

Individuals who had used steroids were more likely to use other illegal drugs (e.g., cannabis, amphetamines and cocaine) and drink alcohol [2,4] than non-steroid-users. Some users reported that they had used both oral and injectable steroids concurrently, a practice referred to as 'stacking', as well as using more than one 'cycle' (e.g., taken over a nine week period) [2,7]. When compared with non-steroid-users, steroid-users were generally more likely to also participate in other sports and activities [3-5,7], and steroids were mainly taken for bodybuilding and weight lifting [3-5]. Finally, one study [6] reported that individuals with a low socioeconomic status would eat more, take food supplements and use steroids for weight and muscle gain when compared with other socioeconomic categories.

The prevalence rates of steroid-use reported across all of the studies ranged from the lowest at 1.2% [1], with the vast majority (five studies) [2-4,6] reporting between 2.3% to 2.9%, with one study at 4.4% [7], and with the highest reported at 11.1% [5]. The four studies that compared steroid-users over a range of different ages highlighted that the earliest reported use of steroids was at age 11 and increased to 13 years-old [3]. However, there appeared to be a slight overlap as one study [6] reported the prevalence rates decreasing from age 12 to 17 years-old. Another study reported [2] that steroid-use was also reported higher among 16 years-old boys than 17 years-old boys, and decreased further from the ages of 17-19 years-old [7]. Two studies [1,6] concluded that the prevalence rates were greater among immigrants when compared with those native to their country.

Table 1 Methodological characteristic of studies.

<i>[Study no.]</i>	<i>First author (Reference no.) Year, Country</i>	<i>Groups defined</i>	<i>Comparing age</i>	<i>Demographics described</i>	<i>Sample</i>	<i>Inclusion/Exclusion criteria</i>	<i>Standardised measures</i>	<i>Other sources of potential biases</i>
[1]	Nilsson (37) 2005 Sweden	Yes	No	Yes	Good	Yes	Yes	The questionnaire collected information regarding lifetime misuse and individuals who had stopped using steroids were placed in the same category as being current users. Therefore, this may have biased the findings. \pm
[2]	Nilsson (6) 2001 Sweden	Yes	Yes	Yes	Good	Yes	Yes	\pm
[3]	Faigenbaum (38) 1998 USA	Yes	Yes	Yes	Moderate	No	No	A limited statistical analysis was conducted (e.g., frequency counts and percentages). \pm
[4]	Lambert (20) 1998 South Africa	Yes	No	Yes	Good	Yes	Yes	The authors used a bilingual questionnaire and there might be linguistic problems with the direct translation, including theoretical issues and questions of generalisability. \pm
[5]	Johnson (39) 1989 USA	Yes	N/A	Yes	Moderate	Yes	No	A formal statistical analysis was not conducted, though frequency counts and percentages were reported. \pm
[6]	Neumark-Sztainer (40) 1999 USA	Moderate	Yes	Yes	Good	Yes	No	The authors of the paper did not explicitly group and compare the steroid-users and non-users - this was the same case for the different age categories. Also the authors only collected data for one weeks period. \pm

Table 1 Cont.

<i>[Study no.]</i>	<i>First author (Reference no.) Year, Country</i>	<i>Groups defined</i>	<i>Comparing age</i>	<i>Demographics described</i>	<i>Sample</i>	<i>Inclusion/Exclusion criteria</i>	<i>Standardised measures</i>	<i>Other sources of potential biases</i>
[7]	Williamson (41) 1993 UK	Yes	Yes	Moderate	Poor	Yes	Moderate	Sample was obtained from one college. Therefore, caution must be applied when generalising the findings to other colleges. ±

Note columns: (1) **Groups defined** (e.g., non-steroid-users VS steroid-users): yes, groups are clearly defined; moderate, groups are partially or indirectly defined; no, groups were not defined. (2) **Comparing different age categories:** yes, participants were separated into different age categories; no, participants were not separated into different age categories. (3) **Demographics described:** yes, participants demographics are clearly described; moderate, participants demographics are partially reported; no, participants demographics are not reported. (4) **Sample representativeness:** good, the sample was collected from more than one educational institution and over more than one geographical area; moderate, the sample was collected from more than one educational institution; poor, the sample has poor representation as they were obtained from one educational institution. (5) **Inclusion and exclusion criteria:** yes, inclusion and exclusion criteria are clearly reported; moderate, inclusion and exclusion criteria are reported partially; no inclusion and exclusion criteria were reported. (6) **Standardised measures:** yes, a standardised measure was used; moderate, suitable but modified measure was used; no, not used.

Note: The following symbol ± refers to self-reporting which may lead to both 'over and under reporting' of steroid-use, though this may have been reduced by using an anonymous procedure.

Table 2 General characteristics and key findings of studies.

<i>[Study no.]</i>	<i>First author (Reference no.) Year, Country</i>	<i>Male sample size [Prevalence rate of steroid-use]</i>	<i>Age range (Sample)</i>	<i>Measures used</i>	<i>Statistical tests used</i>	<i>Summary points and key findings [Effect-size r for associations with steroid-use*]</i>
[1]	Nilsson (37) 2005 Sweden	n = 4049 [1.2% of the sample reported using steroids]	14-, 16- & 18-years-old (Secondary School)	CAN ⁶	Bivariate analyses	Adolescents who used steroids differed in several ways from non-users. Relative to non-users, steroid-users were less likely to report beliefs that steroids are dangerous [$r = -.64$] or that their use is unacceptable [$-.73$]. Steroid-users were comparatively more likely to report: dysphoria [.65]; truancy [.70]; being an immigrant [.52]; training more frequently at gyms [.60]; and a belief that 'girls prefer males with big muscles' [.61]. Steroid-use was associated with use of (and interest in) other substances. Steroid-users were more likely to report: regular alcohol-use [.52]; experience of being drunk [.60]; drinking homemade alcohol [.71]; getting drunk every time when drinking alcohol [.50]; smoking cigarettes daily [.78]; desire to use illicit drugs [.67]; greater use of illicit drugs [.80]; and a belief that they have more fun at parties if drinking alcohol [.60].
[2]	Nilsson (6) 2001 Sweden	n = 2785 [2.9% of the sample reported using steroids]	16-17 years-old (Secondary School and first year of College)	CAN	Cross-tabulation and t-tests.	Compared with non-users, steroid-users were more likely to report training at gyms often [.60], using alcohol regularly [.42], using other illicit drugs [.64], and a belief that girls prefer big muscles [.32]; steroid-users were less likely to report viewing steroids as harmful [-.58].
[3]	Faigenbaum (38) 1998 USA	n = 466 [2.6% male middle school students reported using steroids]	9-13 years-old (Middle School)	Bespoke Questionnaire+	Tabular analysis	Comparison of steroid-users with non-users indicated that: 47% versus 43% believed steroids made muscles bigger [.05]; 58% versus 31% believed steroids made muscles stronger [.30]; 31% versus 11% believed steroids improved athletic performance [.34]; 23% versus 13% believed steroids improved appearance [.19]; 23% versus 9% knew someone their own age who currently used steroids [.29]; and 54% versus 91% believed steroids were bad for them [-.51].
[4]	Lambert (20) 1998 South Africa	Region 1 n = 683 Region 2 n = 713 [2.8% of the sample used steroids with significant differences in prevalence between the two regions ***]	16-18 years-old (School)	Bespoke Questionnaire+	Yates X ² statistic and t-tests	Male sports participants who used steroids reported greater perceived pressure to perform than their non-user counterparts [.39]. Knowledge about steroids was low in both users and non-users of steroids, with little difference in test scores [.08].

Table 2 Cont.

[Study no.]	First author (Reference no.) Year, Country	Male sample size [Prevalence rate of steroid-use]	Age range (Sample)	Measures used	Statistical tests used	Summary points and key findings [Effect-size <i>r</i> for associations with steroid-use*]
[5]	Johnson (39) 1989 USA	n = 853 [Prevalence rate of steroid-use was 11.1%]	16-17 years-old (High school)	Bespoke Questionnaire+	Tabular analysis	Adolescents using steroids were only somewhat knowledgeable about effects and adverse complications of steroid-use. Compared with non-users, steroid-users were more likely to report use of health professionals [.31], and less likely to report use of television [-.31], as sources of information about steroids. Most users (51%) and non-users (57%) reported gathering information from peers [-.07].
[6]	Neumark-Sztainer (40) 1999 USA	n= 3814 [Steroids were used by 2.3% of the adolescents and those in the lowest BMI category (suggesting issues with body image) were at greatest risk of steroid-use.]	12-13, 14-15, & 16-17 years-old (Middle & High School)	VCYS ⁷	Multivariate analyses	Adolescents more likely to use steroids if they: had low BMI [.37], were from minority ethnic groups [.27], or were from families with lower socioeconomic status [.30].
[7]	Williamson (41) 1993 UK	n = 633 ⁸ [4.4% of male students reported steroid-use]	17-19 years-old (College)	Questionnaire+ (11)	X ² Yates Correction tests.	The steroid-users were more likely than non-users to regularly participate in sports [.46] and to report their strength as 'better than average' [.45]; steroid-users were also more likely to over-estimate the prevalence of steroid-use among their peers [.48]. Compared with non-users who participated regularly in sport, steroid-users were more likely to participate in bodybuilding [.66], weight lifting [.36], and rugby [.63].

Notes:

* Effect-size *r* is reported for associations with steroid-use, where relevant/calculable (i.e., from comparisons of steroid users versus non-users). Following Cohen's (1988) conventions, *rs* ≥ .50 may be considered "large", and are highlighted in bold font; *rs* in the order of .10 and .30 may be considered "small" and "medium" respectively.

⁵ Swedish Council for Information on Alcohol and other Drugs (CAN).

+ The questionnaire had been piloted and designed specifically to elicit information regarding steroid-use.

⁷ The Voice of Connecticut Youth Survey (VCYS).

⁸ This study did not explicitly state the total number of males in the sample.

Table 3 Psychosocial characteristics of steroid-users conceptualised with the Theory of Planned Behaviour.

[Study no].	First author (Reference no.) Year, Country	Attitude: (belief, motivation, knowledge of risks associated with steroid-use).	Subjective norm: (social pressures/ influences and support to use or not to use steroids).	Perceived-behavioural-control: (power to obtain, overcome barriers and ease or difficulty to use steroids).
[1]	Nilsson (37) 2005 Sweden	<ul style="list-style-type: none"> To improve appearance Sports ambitions Girls prefer males with bigger muscles Steroids are not harmful 	<ul style="list-style-type: none"> Peer influence Regular muscular training at gyms Perceive steroid-use as 'acceptable' 	<ul style="list-style-type: none"> Some attribute steroid-use to being intoxicated.
[2]	Nilsson (6) 2001 Sweden	<ul style="list-style-type: none"> To improve appearance Steroids are not harmful Girls prefer males with bigger muscles 	<ul style="list-style-type: none"> Trained more at gyms to build up muscles 	<ul style="list-style-type: none"> Bought steroids at gyms, in the street or school yard
[3]	Faigenbaum (38) 1998 USA	<ul style="list-style-type: none"> Make muscles bigger and stronger Enhance appearance Steroids are not harmful 	<ul style="list-style-type: none"> Knew someone their own age who took steroids Have been asked to take steroids More common in some sports (gymnastics, weight training) 	<ul style="list-style-type: none"> Obtained steroids from friends, family members and other individuals
[4]	Lambert (20) 1998 South Africa	<ul style="list-style-type: none"> Increase sports performance, strength, size, endurance, speed, and sex drive Improve appearance, resistance to injury/fatigue, concentration Limited knowledge of potential harms and use despite first-hand experience of some side effects (e.g., aggression, acne, etc.) 	<ul style="list-style-type: none"> Perceive pressure to perform in sport More common in some sports (body building, rugby, karate, weight lifting, tennis) Regional difference in prevalence 	<ul style="list-style-type: none"> Obtained steroids from: the gym (via friends or instructors/owners), team and school friends, coaches, vets, doctors, or pharmacists.
[5]	Johnson (39) 1989 USA	<ul style="list-style-type: none"> Increase in muscle mass and strength Improve appearance Improve sexual performance and penis size Enhance athletic performance 	<ul style="list-style-type: none"> Influenced by their friends 	<ul style="list-style-type: none"> Obtained information from their friends and media (e.g., T.V., magazines and health professionals)
[6]	Neumark-Sztainer (40) 1999 USA	<ul style="list-style-type: none"> Steroids increase weight and build up muscles[†] To improve appearance due to body image concerns[†] 	<ul style="list-style-type: none"> Influenced by their peers[†] 	<ul style="list-style-type: none"> Not reported

Note: [†]Interpretation of study data by original authors (not directly expressed by participants)

Table 3 Cont.

<i>[Study no].</i>	<i>First author (Reference no.) Year, Country</i>	<i>Attitude: (belief, motivation, knowledge of risks associated with steroid-use).</i>	<i>Subjective norm: (social pressures/ influences and support to use or not to use steroids).</i>	<i>Perceived-behavioural-control: (power to obtain, overcome barriers and ease or difficulty to use steroids).</i>
[7]	Williamson (41) 1993 UK	<ul style="list-style-type: none">• To improve physique, appearance• Sporting performance• [Subject to belief that] steroids are not harmful	<ul style="list-style-type: none">• Influenced by sporting competitors• More common in some sports (bodybuilding, weight-lifting, rugby)• Over-estimate use among peers	<ul style="list-style-type: none">• Obtained via the 'black market', mail order, a health professional or an unspecified source

The psychosocial characteristics of steroid-users conceptualised with the Theory of Planned Behaviour as illustrated in Figure 3 and presented in Table 3

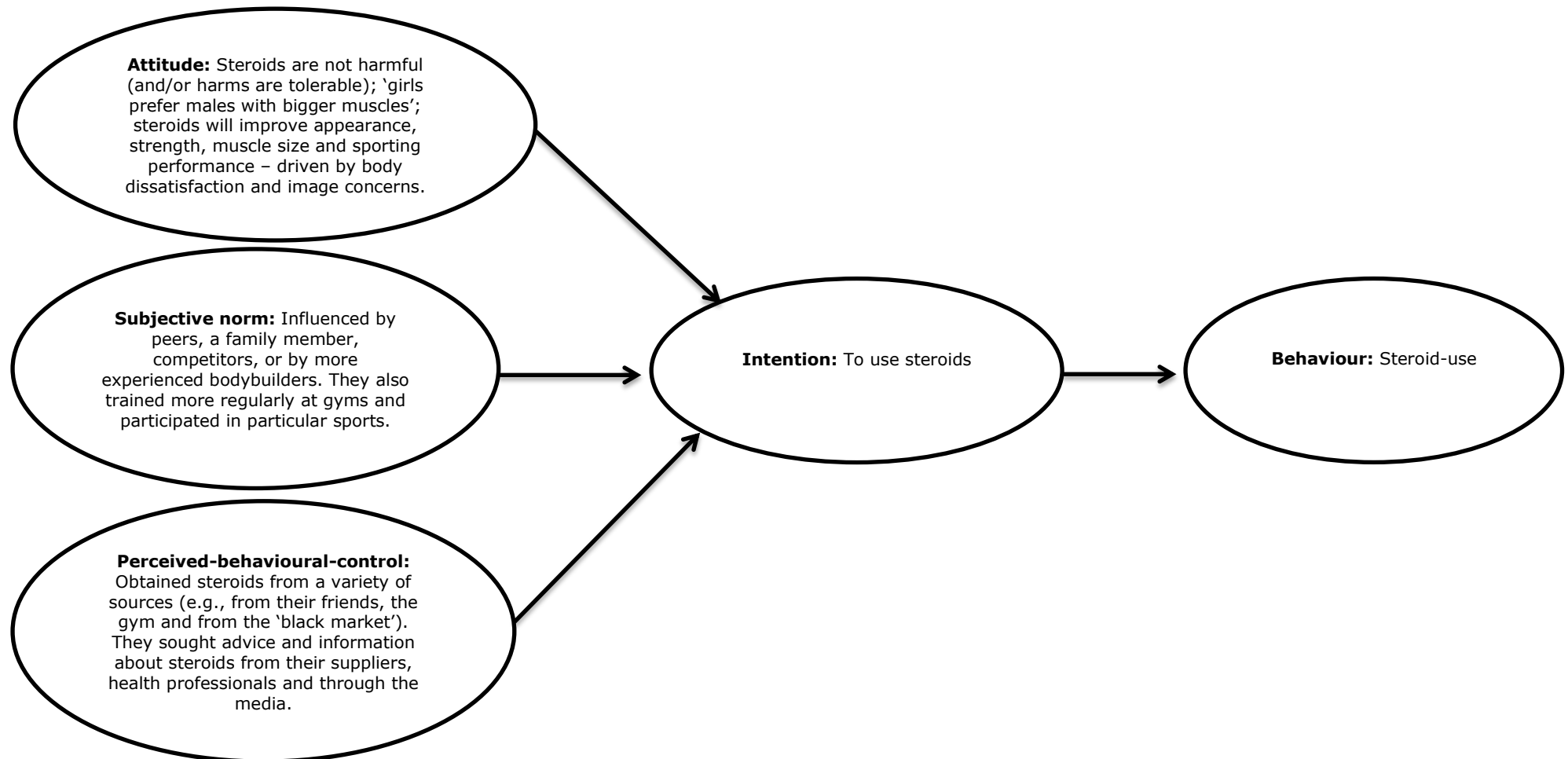


Figure 3 Theory of Planned Behaviour to conceptualise psychosocial factors influencing steroid-use (30)

Emergent Themes Conceptualised from a Theory of Planned Behaviour Perspective

Attitude

All seven studies concluded that adolescents' use of steroids was associated with expected improvement in appearance and their physique. This was mainly driven by their body dissatisfaction and image concerns [1,6], as well as their belief that 'girls preferred males with bigger muscles' [1,2]. Steroid-users wanted to build up their strength and muscle size [2-6], enhance their endurance and speed [4], increase weight [6], attain 'better than average strength' [7], and increase their sporting performance and ambitions [1,3,4,7].

Six studies [1-5,7] investigated the knowledge of associated risks of steroid-use, and most steroid-users indicated a general lack of knowledge (or minimisation) of the potential harmful effects of these drugs. By some indices, steroid-users appeared to be better informed than non-users, but absolute knowledge of risks was low: e.g., 18% of users (versus 9% of non-users) identified acne as a potential side effect in [5]. All steroid-users were able to correctly identify desired physiologic effects (e.g., increased muscle size and strength) from steroid-use with some steroid-users not even exercising and believing they would achieve the benefits. However, some steroid-users had inaccurate knowledge about some of the effects (e.g., increased height and aerobic performance) [5].

Compared with non-users, steroid-users tended to view steroids as less harmful (with large effect-sizes) [1,2,3]. Some steroid-users stated that they would stop using steroids if consumption was proven to lead to permanent damage (e.g., increased liver damage and infertility) [7] although users may persist with steroid-use despite direct experience of adverse side effects [4]

Subjective Norm

The majority of studies [1,3-6] reported that adolescent steroid-users trained more regularly at gyms [1-4], and had been influenced to use the drug by their peers, a family members, someone their own age, or by more

experienced bodybuilders who also used steroids [4]. Users were more likely to know other users [3] and to give higher estimates of prevalence among peers [7], as compared with non-users. Use appeared to be more common within certain sporting [3,4,7] and regional [4] communities. In one study, use was associated with higher perceived pressure to perform in sport [4] and a third of users in another study reported that they would stop using if their sporting competitors stopped [7].

Perceived-behavioural-control

Steroid-users bought their drugs from a variety of sources such as, from their friends [3-5], the gym [2,4], in the streets and from the 'black market' [2,7], in school-yards [2], via mail order [7] and from health professionals [4,7]. They sought advice and information about the drugs from their suppliers [4], health professionals [5] and through the media (e.g., magazines and television) [5].

Discussion

Main Findings

The TPB provides a framework for understanding the relationship between psychosocial factors that influenced steroid-use in male adolescents, as outlined in Figure 3. The findings indicate that steroid-use is a practice not purely associated with athletes aiming to enhance their physical strength and performance. Non-competitive recreational bodybuilders also use steroids mainly with the intention of improving their appearance and physique and this review supports existing research (6,23). One explanation for the adolescents' emphasis on their body may be due to body dissatisfaction and body dysmorphia, which may be evident during the early stages of puberty where they may perceive themselves as smaller than their peers (37). Additionally, the exposure of the media (e.g., idealistic representation of masculinity and male body ideal) may also influence their choice to use supplements and steroids (39,42). Notably, adolescents with low body mass index values have been reported to use steroids which is inconsistent with the image that only larger athletes (e.g., weightlifters) are at risk of steroid-use (40). The most common sources to obtain steroids

were from friends and within gyms themselves, and suppliers at these venues were perceived as more experienced bodybuilders and extremely influential when providing advice (which may not be factual) about steroid-use.

Some studies within this review support the notion that non-steroid-users are more knowledgeable than steroid-users about the associated risks with steroid-use (6, 37, 38,), though the reverse finding was found in one study (20). It is hypothesised that a potential steroid-user who is knowledgeable about the potential side effects, who has an understanding about training routines and correct nutrition may be less likely to use steroids than those who do not have this knowledge (43).

Adolescent steroid-users are taking more risks by using other illicit drugs concurrently (e.g., cannabis, amphetamines and cocaine) when compared with non-steroid-users, as well as admitting to habitual steroid-use for longer than a year and using multiple 'cycles' (44). Furthermore, it has been reported in the literature that moderate doses of steroid-use are reversible and this information may make its way into the gyms and present as a justification for the steroid-user (45). Although, other risk behaviours were not revealed within this review, researchers such as Middleman (28) have highlighted that steroid-use has been associated with sexual promiscuity and unprotected intercourse. Additionally, the sharing of needles and syringes may also lead to the contraction of HIV and hepatitis B (46), and changes in personality (such as increased aggressiveness) (24).

Although, it was not a main objective of this review and the search strategy was not designed to capture this information, it is worth pointing out that the highest prevalence rates among adolescents originated from an America sample (39). However, the problem still exists within the European and African samples studied, albeit at a much lower rate, but is consistent with previous research (13, 14, 47). Unfortunately, limited data currently exists for a UK sample, though studies with adult users confirm that steroid-use often begins during adolescence (48).

What appears alarming is that some adolescent steroid-users began using the drug at 11 years-old. However, they might actually start at a younger age given the restricted age range being assessed by most studies (10). Steroid-use appeared to increase up until age 13 before slowly decreasing towards the age of 19 and one can assume that the steroid-user may 'grow out' of taking them during their twenties, however, this will need to be investigated further to reveal this trend. The race and ethnicity of steroid-users within this review suggested that steroid use was greater among immigrants (37), however other researchers have revealed significantly higher rates among white (49) and black adolescents (50).

Limitations of the Review

A small number of studies were selected for inclusion within this review. However, this was due to the limited existing research within this distinct population. The exclusion of studies that had a sample above the cut off age of 20 (though were still deemed as adolescents by their authors) could have potentially reduced their significant contribution and evidence base to this review. Nonetheless, the need to standardise the sample included within this review and to keep the age range as homogenous as possible justified the omission of those studies.

Quantitative methods using questionnaires were used within all of the studies, however within three studies the questionnaires appeared not to have been validated. The researchers used an anonymous procedure to minimise the 'over and under reporting' from the sample, and this methodology has been proven as an effective and valid measure of recreational drug use among adolescents (51). In addition, an alternative qualitative methodology that uses an interview assessment may have been an intimidating experience for the adolescent and prevented them from admitting to drug use. Nevertheless, it would have provided invaluable information regarding their subjective experience.

Finally, only peer-reviewed literature was included with the intention of theoretically improving scientific and methodological quality of the research

papers. It may be advantageous to include the 'grey-literature' within future reviews to broaden the available literature to formulate conclusions.

Clinical Implications

There is a dearth of literature on adolescent steroid-use and prevention strategies. Steroid-use is another form of drug abuse that may contribute towards psychological and physiological health-related problems. There is a need to encourage the potential steroid-user to become less dismissive about the potential side effects associated with using steroids, which will benefit the steroid-user and the wider community. As conceptualised from a TPB perspective, the male steroid-user's psychosocial and behavioural pursuit for and struggle with masculine appearance and ideal physique, suggests that clinical psychologists are well placed to utilise these findings, conduct further research, provide assessment, consultation and treatment to the potential clinical conditions that may emerge from the pursuit of masculinity (52,53).

Future Research and Preventative Programmes

Considering a vast percentage of steroid-use takes place outside of athletics and competitive sports means that drug-testing programmes are not an effective deterrent. Legislative initiatives that are more punitive may drive the dealers and steroid-users into the 'black market', which may invariably increase the risk for the steroid-user (e.g., reduced quality of the drug). Therefore, alternatives such as better education for male pre-teenagers and teenagers about the ill-effects of steroid use (particularly related to masculinity, e.g., reduced sperm count, infertility, shrinking of testicles, baldness, and breast development) may serve to counteract the perceived benefits to masculine ideals, such as strength and muscle mass. Education and harm reduction programmes appear to be the preferred option and need to identify those who are at potential risk of misusing steroids. This review supports the existing literature that education strategies and interventions should start at a much younger age to provide education and information about steroids (33). Furthermore, they will need to target and change the psychosocial factors as highlighted in the TPB model and reach out into the gyms. For example, by creating awareness and more realistic

expectations among heterosexual/bisexual male adolescents about the real preferences and values among girls (believing that 'girls prefer males with bigger muscles') may help to change their attitudes. More research is needed to understand the adolescents' attitude and pressure to conform to their peers and with the social construction of masculinity as presented in the media. Unfortunately, none of the studies within this review investigated the cost or dosage of taking steroids and this crucial information cannot be included within the psychological model. Finally, future research is needed to examine the clinical and cost-effectiveness of intervention programmes.

Conclusions

Although there were a small number of studies included within this review, it has nevertheless achieved a systematic overview of the sparse literature available within this research area. It has revealed how the prevalence rates are increasing among even younger adolescents and expanding on an international level, with more severe risk implications on the steroid-user's health as they are engaging in more risky behaviours (e.g., multiple drug misuse). It has also highlighted clear differences between the knowledge and attitudes of the steroid-user and non-steroid-user. These issues identified require urgent action and are a concern for healthcare providers and policymakers and further research into this distinct population is timely. The complex interaction of psychosocial factors were conceptualised within the TPB. This provided a conceptual understanding of how adolescents' attitude, subjective norm, and perceived-behavioural-control may all be combined to affect their behavioural intention and actual steroid-use. This psychological framework could offer a useful template for future research (e.g., when developing prevention programmes) in hope of reducing steroid-use among adolescent males.

Declarations of Interest

None.

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Journal Paper

Examining Psychosocial Factors Associated with Adult Male Anabolic Androgenic Steroid Use Among Gym Users⁹

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Abstract

In the UK, the illegal use of anabolic androgenic steroids¹⁰ among recreational gym-users has been increasing alongside an increase in the number of steroid-users accessing harm reduction services. Steroid-misuse is a growing public health concern. This study aimed to examine the application of the Theory of Planned Behaviour¹¹ (TPB; Ajzen, 1991) to explain intentions to use steroids in male gym-users and to explore differences between users and non-users. One-hundred and sixty participants completed an online or paper questionnaire. Findings highlighted that a positive attitude towards steroid-use among users is the most important contributing factor for explaining future intentions to use the drug. Between group comparisons highlighted that steroid-users' attitudes towards steroid-use and perceived-behavioural-control (i.e., higher level of positive control and factors that enabled steroid-use) were higher than non-users. Non-users' normative beliefs (i.e., perceived increase in negative social pressure and disapproval from significant others) were higher than users. Conversely, users perceived a positive outcome of steroid-use, whereas non-steroid-users perceived an increased negative outcome of steroid-use for behavioural beliefs. In conclusion, this study provides evidence that the application of the TPB can be useful in understanding the future intentions of steroid-use or non-use. The TPB could be used in future research as a template for the development of prevention programmes and applied within clinical practice to help reduce the use of the drug.

Keywords: Anabolic androgenic steroids, attitudes, male, theory of planned behaviour

¹⁰ 'Anabolic androgenic steroids' will be referred to as 'steroid(s)' in the rest of the paper.

¹¹ This is a commonly used abbreviation used for the TPB within the literature.

Introduction

Anabolic Androgenic Steroids¹²

Anabolic androgenic steroids are a synthetic derivative of the naturally produced male sex hormone testosterone. Steroids have two main effects, which are anabolic (referring to muscle/tissue building properties) and androgenic (referring to increased masculinizing sexual characteristics) in both males and females (Rashid, Ormerod & Day, 2007). Steroids are legally prescribed¹³ for the treatment of diseases such as cancer and AIDS because of resultant loss in lean muscle mass, and to treat conditions such as delayed puberty developed from steroid hormone deficiency. However, some competitive athletes, bodybuilders and others (e.g., recreational gym-users) use these drugs to enhance their performance and/or physical appearance. Steroids come in both injectable and oral forms and can be taken together in a procedure known as “stacking” (National Institute on Drug Abuse [NIDA], 2001). Individuals of all ages are reported to abuse these drugs (including adolescent boys), and having steroid-using acquaintances may influence an individual’s desire to use the drug (Komoroski & Richert, 1992). Steroids also increase body weight, fat-free mass and strength when combined with a strength-training programme (Wiefferink, Detmar, Coumans, Vogels & Paulussen, 2008). The reasons for abusing steroids are myriad¹⁴. Some individuals may suffer from a body dysmorphic disorder, which involves a pathological preoccupation with a perceived defect of in his or her physical appearance and one’s degree of masculinity (i.e., a perception of looking small and weak) (Olivardin, Pope & Hudson, 2000; Pope, Katz & Hudson, 1993). Some steroid-users report that their steroid-use is partly responsive to experiences of physical and/or sexual abuse and that they started taking steroids because they believed becoming bigger and stronger would decrease their vulnerability to future abuse (NIDA, 2006). Others believe that taking steroids is a way of getting healthy and fit despite evidence that steroid-use can be dangerous (and potentially habit-forming) (National Health Service [NHS], 2012).

¹² See extended background literature chapter A.1.1., for more information about the history of steroid-use.

¹³ See extended background literature chapter A.1.2., for more information about Governmental legislation of steroid-use in the UK.

¹⁴ See extended background literature chapter A.1.3., for additional information about why people start using steroids.

Risks of Anabolic Androgenic Steroid-use¹⁵

Numerous studies have identified serious risk factors and side-effects associated with steroid-use. In brief, these include associated psychological and behavioural conditions such as depression, increased aggression, and substance addiction (Yesalis & Bahrke, 1995), while physical side-effects include kidney and liver damage, hypertension, impotence, and gynaecomastia (breast development) (Institute for the Study of Drug Dependence, 1993; Pope & Katz, 1994; Rich et al., 1998). Individuals that use injectable steroids and share blood-contaminated syringes and needles are at a real risk of transmitting the hepatitis as well as HIV infections (Nemechek, 1991). The oral use of steroids involves the liver slowly removing the substance from the body and has been correlated with several harmful side-effects (Korkia & Stimson, 1993). A study by Pärssinen and Seppälä (2002) reported that enduring steroid-use could increase premature mortality. However, this phenomenon was found in power lifters who used multiple steroids to increase performance rather than recreational gym-users. The reported causes of death were suicide and acute myocardial infarction (NIDA, 1990). This study contributes to the evidence that steroids have long-term detrimental effects on health.

Prevalence¹⁶

According to the British Crime Survey, approximately one per cent of 16-59 year olds have used steroids (Home Office, 2014). Korkia and Stimson (1993) reported 9.2% of male gym-users had used steroids, and this figure increased to 29.5% in the more “hardcore” gyms that specialised in bodybuilding (where more heavy weight training equipment is available). These findings were contrasted with mainstream “fitness” gyms that contain more cardiovascular training equipment and whose clientele that accounted for 1.5% of reported steroid-users (Lenehan, Bellis & McVeigh, 1996). Shapiro (1992) reported that needle exchange services in the UK have observed a significant increase in the number of steroid-users; for example, the Bristol Drug Project reported that these individuals contribute to over 44% of those who attend their services (BBC News, 2012). However, it is difficult to ascertain with accuracy the real prevalence of steroid-use based on the available data due to methodological issues (e.g.,

¹⁵ See extended background literature chapter A.1.4., for additional information about the patterns of steroid-use and associated risks.

¹⁶ See extended background literature chapter A.1.5., for more information about the prevalence rates.

limitations of self-reports, participants withholding of information regarding actual drug-use) and the actual figures may be much higher.

Research conducted by Wright, Grogan and Hunter (2001) revealed that British men invest a large proportion of their time and resources in the maintenance and building of their bodies. The use of steroids and other drugs such as human growth hormone is becoming increasingly more widespread in Britain (Drugs and Sport Information Service, 1997; Lenehan, 2003). Furthermore, steroid-misuse and abuse is often associated with other drug use such as alcohol and tobacco (Dodge & Hoagland, 2011). The overwhelming majority of steroid-users are currently male (Bahrke, Yesalis, Kopstein & Stephens, 2000), with female use generally restricted to competitive bodybuilders and sportswomen (Lenehan, McVeigh & Bellis, 1996). Therefore, this study will focus only on male users and non-users. The steroid-user's knowledge of side-effects are not sufficient enough to stop, prevent, or reduce harmful use and there is a need to understand factors driving behaviour, which will not be purely rational and information led, as there is a lack of recognised preventative programmes in the UK¹⁷ (National Treatment Agency for Substance Misuse [NTASM], 2006).

Psychological Understanding of Anabolic Androgenic Steroid-use

Within the field of drug-abuse preventative research, an understanding of cognitive components like perceived social norms, knowledge of the drug or beliefs is important when predicting intention and behaviour of drug-users (MacKinnon et al., 2001). Furthermore, information regarding psychosocial factors, such as attitude, subjective norms, and perceived-behavioural-control is important when ascertaining a person's likelihood of fostering or rejecting healthy behavioural habits (Allahverdipour, Jalilian & Shaghagi, 2012). The Theory of Planned Behaviour (TPB; Ajzen, 1991) was chosen for this study due to its strengths (e.g., consideration of social influence), which potentially makes the model more holistic than some alternatives¹⁸ such as the Health Belief Model. Finally, the TPB can explain 44.3% of variance in intention and 19.3% of the variance in behaviours (McEachan, Conner, Taylor & Lawton (2011).

¹⁷ See extended background literature chapter A.1.6., for more information regarding public health relevance and current harm reduction programmes.

¹⁸ See extended background literature chapter A.1.7., to A.1.8., for more information about the research into attitudes-behaviour theories, consideration of alternative models and the rationale for using the TPB.

Ajzen's TPB model (Figure 4) suggests that a person's behaviour is predicted by intentions to carry out the behaviour. Intentions are an individual's plan to behave in a specific way and represent the motivation towards the behaviour. Therefore, theoretically, the stronger the person's intention is to perform the behaviour the more likely they are to carry it out. Intentions themselves are a function of three basic determinants: a person's attitudes towards the behaviour, subjective norms and perceived-behavioural-control (PBC) over the behaviour. The attitude of a person towards a particular behaviour is based on an individual's overall evaluations of the behaviour as being either good or bad. Subjective norms assess an individual's perceived social pressures compelling a person to perform or not perform a particular behaviour. Finally, PBC represents the understanding a person has about his power to act and carry out the behaviour by either influencing the intention to perform the behaviour or by influencing the behaviour directly. Collectively, these variables affect intentions and actions to perform or not perform the behaviour. For example, an individual is more inclined to carry out a behaviour if they have a positive attitude towards it, perceived social pressure from others to carry it out and a perception that the ability to perform it is under their control.

Underlying each of these components are individual beliefs. Attitudes are influenced by beliefs about the likelihood that performing a behaviour will result in a particular outcome (behavioural beliefs), weighted by corresponding favourable or unfavourable judgements about different implications of the behaviour (outcome evaluations). Subjective norms are based upon beliefs about how other people (significant others) would like them to behave (normative beliefs), weighted by their general motivation to comply with these significant others (motivation to comply). PBC is influenced by beliefs about the likelihood of several factors that may enable or prevent the behaviour (control beliefs), weighted by the expected outcome of these factors would have if they were to occur/be present (perceived power to influence).

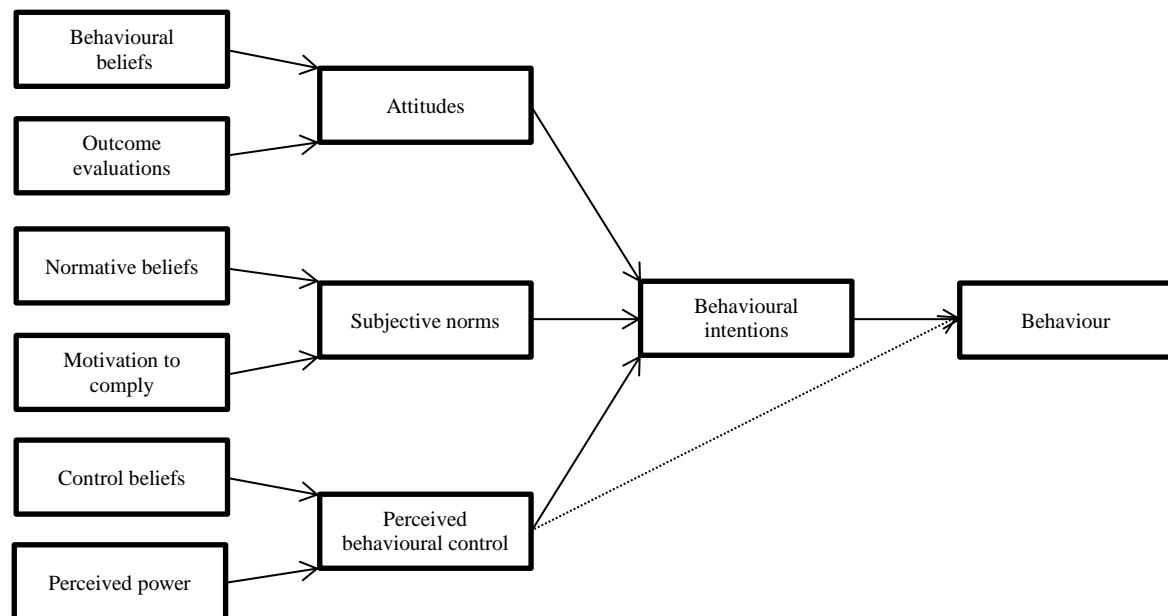


Figure 4. The Theory of Planned Behaviour (Ajzen, 1991)

Some critics (e.g., Sniehotta, Presseau & Araújo-Soares, 2014) have argued that the TPB assumes all behaviours are rational. However, Ajzen emphasised that the TPB does not posit that people are rational nor do they behave in a rational manner. Furthermore, the TPB does not make any assumptions about how the underlying beliefs were formed, which may be irrational or reflect unconscious bias, though the theory stipulates that attitudes, subjective norms and PBC follow relatively and consistently well from these beliefs.

It is commonly acknowledged that individuals often fail to act in a manner conforming to their stated intentions (Ajzen, Brown & Carvajal, 2004). Ajzen et al. (2004) offer an explanation of this intention-behaviour discrepancy which has partially been attributed to a hypothetical bias. For example, beliefs that are activated in the hypothetical scenarios where the TPB constructs are typically assessed, which may have more favourable or fewer unfavourable considerations, are different from beliefs that are accessible in real situations in which a behaviour is performed. Alternatively, events may occur between the assessment of intentions and the execution of a behaviour (e.g., unanticipated obstacles) such that intentions are not acted upon. Consideration of these empirical findings and theoretical arguments implies that one should not assume that decision-making is purely rational and there should be allowance for inconsistency or non-rationality in the link between variables such as intention-behaviour (Richetin et al., 2010).

The TPB has been applied in several studies, and most of them have supported its predictive validity when related to drug abuse (Collins, Witkiewitz & Larimer, 2011). A few studies have examined the TPB conceptualisation of steroid-use among gym-users¹⁹ (e.g., Allahverdipour, Jalilian & Shaghaghi, 2012; Enaker, 2013; Jalilian, Allahverdipour, Moeini & Moghimbeigi, 2011). However, Jalilian et al. investigated how the TPB was used to assess participants' ability to abstain from steroid-use during a preventative intervention programme. Allahverdipour et al.'s study found that the TPB variables (attitude, subjective norms and PBC) accounted for 63% of the variance in intention to use steroids in an Iranian sample, whereas Enaker's study found that the TPB variables explained 15% of the variance in intention to use steroids in an American sample. Notably, PBC was the most influential predictor variable for both studies. However, both studies had a small homogeneous sample size and there are linguistic barriers (specifically in relation to Allahverdipour et al.'s study), theoretical issues and cultural differences to consider for them, which limit the value of the survey's application in the UK.

Rationale for Research²⁰

Steroid-misuse is a growing health concern since the risk factors remain poorly understood (Pope, Kanayama & Hudson, 2012). In order to prevent steroid-misuse and its negative consequences we need to explore steroid-user and non-user attitudes, motivations and beliefs regarding steroid-use, including how social pressures and norms contribute and influence a person's intention to use or not use steroids. Furthermore, investigating how steroid-users overcome barriers and use facilitators is necessary. Finally, the study explored the relative importance of the underlying beliefs that influence steroid-use or non-use within this population. There has been a sharp increase in the number of young men who are now using steroids so research into this trend is timely.

It appears that most of the existing literature into steroid-use has been derived from an American population. Over the past decade more studies have been conducted using UK samples, however, there is a strong need to expand the existing literature.

¹⁹ See extended background literature chapter A.1.9., for an extended review of the literature pertaining to the TPB conceptualisation of steroid-use.

²⁰ See extended background literature chapter A.1.10., to A.1.11., for a further rationale for this research, including theoretical and clinical implications.

Research into methods for preventing and reducing the use of steroids is limited. There are no recognised drug treatment provisions for steroid-users in the UK, and harm reduction programmes have become the most common health interventions (NTASM, 2006). This study may improve understanding of beliefs and perceptions implicated in steroid-use, with potential to inform preventative or ameliorative intervention planning. The steroid-user's social, cognitive and behavioural drive when pursuing a masculine physique proposes that clinical psychologists are well qualified and appropriately placed to carry out research and assessment of such individuals, and to provide treatment for prospective clinical illnesses emerging from the steroid-misuse (Pope, Gruber, Choi, Olivardia & Phillips, 1997). Furthermore, clinical psychologists are sufficiently trained to offer a range of services to service-users (Miller & Brown, 1997) by working alongside needle exchange and mental health services and providing psycho-education to health-care professionals and service-users to increase awareness about the possible side-effects of using steroids as well as learning about safer practices.

Aims

This study aimed to examine the application of TPB variables attitude, subjective norms, PBC and their respective underlying beliefs to account for the variation in the intention to use steroids. Intention indicates an individual's readiness to carry out a given behaviour and is assumed to be the direct antecedent of behaviour that is subject only to *actual* behavioural control (e.g., opportunity). The study also explored the differences between steroid-users and non-steroid-users in terms of the TPB variables (i.e., differences in explanation of actual past or current behaviour, and predictions of future intentions within a steroid-user group).

Research question 1. Within self-identified steroid-users, to what extent can future intention to use steroids be accounted for in terms of attitudes, subjective norms, PBC and their respective underlying beliefs? (i.e., to what extent can the TPB be usefully applied to steroid-use?).

Research question 2. To what extent can steroid-use versus non-use be accounted for by variables within the TPB? (i.e., by comparing steroid-users with non-steroid-users).

Question 1 focused directly on a steroid-using population, whereas question 2 compared steroid-users with non-steroid-users²¹.

Methodology²²

Design

This is a cross-sectional survey study, which forms part of a broader mixed methods project (using an exploratory sequential design, wherein an initial qualitative phase informed the design of a quantitative questionnaire). This paper focuses on quantitative data from the second phase of the design.

Sample Size and Justification

The sample size for question 1 (multiple regression approach), which was informed by statistical power analysis and a moderate effect size (i.e., multiple R of around 0.3, Cohen, 1988), was chosen in accordance with recommendations for TPB studies. Normally a sample size of 80 participants would be acceptable (Francis et al., 2004). The sample size for question 2 (logistic regression approach) required a larger sample size compared with other linear models. Some researchers recommend at least 30 cases for each parameter (predictor variable) to be estimated (Sparks, 2014). Therefore, as there are three parameters within each of the models, 90 cases were required.

Participants

One hundred and sixty male recreational gym-users (85 steroid-users and 75 non-steroid-users) participated in the study. Participants were recruited²³ via advertisements across various online social media (e.g., Facebook, bodybuilding forums) and snowballing, whereby interested parties were asked to forward the survey's link to their acquaintances. Participants accessed the online questionnaire using 'Survey Gizmo'. Additionally, participants were recruited from Addaction²⁴ within Lincolnshire, where paper copies of the TPB questionnaire²⁵ were made available. Health professionals provided interested service-users with an information sheet before

²¹ An additional question (question 3) is presented in the extended background literature chapter A.12.

²² See extended methods chapter B.1., to B.2., for an overview of the methodology, and B.3., for the first author's epistemological position.

²³ See extended method chapter B.8.1., to B.8.4., for a further account of the recruitment and procedure.

²⁴ A British charity established to work with people who are addicted to drugs and alcohol (Addaction, 2014).

²⁵ See Extended Appendix I for a copy of this questionnaire for steroid-users.

administering the TPB questionnaire. Service-user's completion of the questionnaire was an indication of their informed consent. A debrief form was provided and participants had the option to return the TPB questionnaire via post to the researcher. Finally, an adapted version for the TPB questionnaire²⁶ was also developed for non-steroid-users and was available online at 'Survey Gizmo'.

Ethical Approval²⁷

Ethical approval was granted from the University of Lincoln.

Materials

TPB measure²⁸ was generated for the purpose of this study (as part of a broader project), based on published guidelines (e.g., Francis et al., 2004) for designing questionnaires to capture TPB constructs for specific social or psychological phenomena - in this case, with a specific focus on steroid-use. Several studies, as mentioned above, have supported the predictive validity of TPB measures regarding drug abuse (e.g., Collins, Witkiewitz & Larimer, 2011) and steroid-use (e.g., Jalilian, Allahverdipour, Moeini & Moghimbeigi, 2011). Section one of the TPB questionnaire contained 22 questions exploring various demographics such as age, ethnicity, and level of education. The questions also explored the participants' knowledge regarding risk factors associated with steroid-use, and their training routines. Section two contained a total of 62 questions assessing intention, direct (attitude, subjective norms and PBC), and indirect measurements (behavioural, normative and control beliefs) of the TPB. For example, direct measures asked participants about their overall attitudes, whereas indirect measures asked about specific behavioural beliefs and outcome evaluations.

Behavioural intentions. In the TPB literature, research regarding an individual's own health-related behaviour (e.g., exercise, smoking) recommends measuring their generalised intention (Francis et al., 2004). Although the authors suggest including three specific questions, as there is empirical and considerable response consistency between these items, the wording of two questions was adapted since they were more applicable

²⁶ See Extended Appendix N for a copy of this questionnaire for non-steroid-users.

²⁷ See extended method chapter B.4., to B.4.3., for ethical considerations.

²⁸ Prior to this study, an elicitation (pilot) study was conducted on 28 steroid-users in order to develop the TPB questionnaire (see extended results chapter C.2.1., to C.4.).

to the behaviour of the steroid-users. For example, “*I expect to*” and “*I want to*” “*use steroids*” was changed to “*I plan to*” and “*I will*” “*use steroids in the next six months*”. Furthermore, a time frame of six months was also included to help orientate the participants. Therefore, participants’ intentions to use steroids were assessed with three questions, for example, “I intend to” (a), “I plan to” (b), and “I will” (c) “use steroids in the next six months”. These items were scored from 1 (Strongly disagree) to 7 (Strongly agree). Average ‘intention’ scores ranged from 3 to 21, with higher scores indicating greater intention to use steroids within the following six months. Multiple items were used for measuring the construct, as the danger with a single item is that there is some artefact of item wording or content that misrepresents the construct of interest (Diamantopoulos, Sarstedt, Fuchs, Wilczynski & Kaiser, 2012). Within this current study, items showed high internal consistency (see Table 4), which suggests that they were measuring the same construct.

The response scale was unidirectional (e.g., measuring probability) and although a five-option response format have been used in the TPB literature, a seven-option response format is highly recommended and was adopted as it would provide a greater range for the participants to discriminate between choices.

Attitude. Four questions were asked and included two instrumental items (whether the behaviour achieved something e.g., *worthless-useful*) and two experiential items (how it felt to perform the behaviour e.g., *unpleasant-pleasant*). For example, “For me, using steroids would be...,” was followed by the choice of bipolar adjectives (e.g., pair of opposites) (a) *Harmful-Beneficial*, (b), *Good-Bad*, (c), *Enjoyable-Unenjoyable*, and (d) *The wrong thing to do-The right thing to do*. These items were scored from 1 to 7, and items (b) and (c) were reverse scored. Averaged ‘attitude’ scores ranged from 4 to 28, with higher scores representing stronger positive attitudes towards steroids.

Subjective norms. Three questions were asked relating to the opinions of influential and important people regarding their steroid-use. For example, (a) “*Most people who are important to me think that I ____ (should/should not) use steroids*”. Participants also had to responds to questions, (b) “*It is expected of me that I use steroids*” (*Strongly disagree-Strongly agree*), and (c) “*I feel under social pressure to use steroids*” (*Strongly disagree-Strongly agree*). Items were scored from 1 to 7, and

item (a) was reversed. Averaged 'subjective norms' scores ranged from 3 to 21, with higher scores indicating a perceived positive social pressure from others to use steroids.

PBC. Four questions were developed and reflected participants' confidence that they were capable of using steroids. Participants had to complete two questions measuring self-efficacy. For example, (a) "*I am confident that I could use steroids if I wanted to*____(*Strongly disagree-Strongly agree*)", and (b) "*For me to use steroids is*____(*Easy-Difficult*)". Participants also completed two questions measuring controllability. For example, (c) "*Whether I use steroids is entirely up to me*____(*Strongly disagree-Strongly agree*)", and (d) "The decision to use steroids is beyond my control____(*Strongly disagree-Strongly agree*)". Items were scored from 1 to 7, items (b) and (d) were reversed. Averaged 'PBC' scores ranged from 4 to 28, with higher scores indicating an individual's confidence that he is capable exercising control over his steroid-use.

Behavioural beliefs. In the TPB literature, although some researchers have questioned the validity of the assumption that belief strength and outcome evaluations are combined in a multiplicative manner to affect attitudes, there is strong empirical research supporting the validity of a multiplicative combination rule (see Ajzen & Fishbein, 2008). According to the TPB, having a positive attitude towards a behaviour is driven by the belief that the behaviour will likely lead to either a positive or negative evaluated outcome. Therefore, the likelihood and evaluation judgements are weighted (multiplied) and combined (e.g., behavioural beliefs x outcome evaluations: BB x OE). Behavioural beliefs were assessed with 11 items selected from the pilot/elicitation study (i.e., *build up muscles more quickly, enhance recovery time, increase strength, improve physical appearance, enhance potential/training ability, mood will improve, improve competitive performance, cause visible/physical side-effects, cause internal side-effects, mood will be negatively affected, and become dependent on them*). Participants were required to rate the likelihood of a specific outcome of using steroids in relation to each of the costs and benefits on a unidirectional scale. Scores ranged from 1 (*Unlikely*) to 7 (*Likely*). Outcome evaluations were assessed with a bidirectional scale as participants were required to rate their positive or negative evaluation of each of the 11 consequences. Scores ranged from -3 (*Extremely undesirable*) to 3 (*Extremely desirable*). The bidirectional scale was used as the interpretation of the scoring is

clearer, especially when the midpoint of the scale is zero, meaning that final scores will either represent an influence for or against carrying out the behaviour. Notably, disagreement with a positive belief statement will make a negative contribution to scoring, whereas disagreement with negative statements makes a positive contribution to scoring. Each belief statement was multiplied by a corresponding outcome evaluation and a mean was computed (with a possible score range from -21 to 21), with higher scores indicating that steroid-use will likely lead to positive evaluated outcomes.

Normative beliefs. The TPB proposes that an individual's perception of whether particular significant other(s) believe that he should perform a behaviour or not (normative beliefs) is multiplicatively combined with his motivation to comply with them (motivation to comply). Eight items were created consisting of both descriptive norms (what important people actually do) and injunctive norms (what important people think someone should do). The pilot/elicitation study highlighted eight selected referents (i.e., *most other people/non-users/wider society, family, other bodybuilders and gym-users, medics, friends, partner, athletes and coaches, and work colleagues/employer*). Normative beliefs were assessed by participants selecting whether referents would either support or oppose his steroid-use. For example, "*My family would ____ (disapprove/approve) of my steroid use*". Scores ranged from -3 to 3. Motivation to comply was assessed by participants responding to the various sources of social pressure and whether they would do what each referent wanted them to do. Scores ranged from 1 (*Not at all*) to 7 (*Very much*). Normative beliefs were multiplied by its matching motivation to comply (i.e., NB x MC) and a mean was calculated (possible score range from -21 to 21), with higher scores indicating a perceived positive social pressures (i.e., significant others approve/think that they should use steroids) and a general motivation to comply with these significant others.

Control beliefs. The TPB states that control beliefs are based on the frequency of occurrences of variables likely to enable or prevent the behaviour (control beliefs) and the individual's perception of the magnitude to which of these variables may enable or prevent performance of the behaviour (perceived power to influence behaviour). Control beliefs were assessed with five items obtained from the pilot/elicitation study (i.e., *made legal, accessible over the counter, able to identify a reliable supplier, have enough money, and certain about the quality*). Participants rated the extent to which

each of the potential barriers would enable them or prevent them from using steroids. For example, “*Steroids will be made legal ____ (Unlikely-Likely)*”. Scores ranged from 1 to 7. Perceived power was assessed by participants rating whether factors makes it more or less likely, or easier or more difficult to use steroids. For example, “*If steroids were legal, it would make it ____ (much more difficult-much easier) to use them*” and “*If I know a reliable supplier, I am ____ (less likely-more likely) to use them*”. Scores ranged from -3 to 3. Beliefs were multiplied by the matching perceived power items (i.e., CB x P) and a mean computed (possible score range from -21 to 21). Higher scores indicated an individual’s belief of the likelihood of several factors that enable steroid-use, as well as the expected impact of these factors making it more likely/much easier to use steroids.

Analyses²⁹

Quantitative analysis was performed with IBM SPSS version 21 for Windows. The internal consistency of the TPB measures was tested by using Cronbach’s alpha. Relationships between the predictor (independent) variables and the outcome (dependent) variable were examined using Pearson correlations. Predictor variables that were not statistically significantly correlated with intention were excluded from the analysis. Research question 1 was analysed with a robust (bootstrap)³⁰ hierarchical multiple regression procedure to analyse the total variance explained in steroid-use intentions³¹. Research question 2 was analysed with two separate robust (bootstrap) logistic regressions (one for the direct and one for the indirect measures of the TPB constructs) to determine whether the differences between steroid-users and non-users could be accounted for in terms of the TPB (explanatory) variables³².

²⁹ See extended results chapter C.7.1., for a discussion regarding parametric and nonparametric testing and C.7.2., for the preliminary analysis.

³⁰ As the assumption of normality was violated, a bootstrap (Efron & Tibshirani, 1993) option was chosen (see extended results chapter C.8.10., for a further discussion).

³¹ See extended results chapter C.8., to C.9.2., for the hierarchical multiple regression analysis and checking of assumptions.

³² See extended results chapter C.10., to C.10.8., for the logistic regression analysis and checking of assumptions.

Results Section

The mean age of participants was 32.43 years (range: 18 to 55 years)³³. The vast majority of participants were White British (65%) or White (19.4%), were either employed for wages (66.3%) or self-employed (18.8%), single/never married (48.8%) or married/in a civil partnership or domestic partnership (46.9%).

Research Question 1.

Descriptive statistics. Table 4 below summarises the descriptive statistics of steroid-users based on their reports of each of the factors within the TPB. An internal consistency analysis, in this case Cronbach's alpha³⁴, is also included. For the direct measure, the findings showed that participants had a strong future intention to use steroids, strong positive attitudes towards them and reported strong PBC (i.e., positive control to use and/or the ability to administer steroids was fairly easy). However, they perceived a strong social pressure to not use steroids. For the indirect measure, the findings indicated that participants' perceived positive outcome evaluations of steroid-use (behavioural beliefs) encouraged steroid-use. However, participants perceived a weak negative social pressure (i.e., significant others would disapprove/think that they should not use steroids) (normative beliefs), and a weak level of positive control and that factors enabled steroid use (control beliefs).

Table 4

Descriptive statistics, number of items (N), Cronbach's alpha, mean scores, standard deviations and range of all the predictor variables

Constructs	N	Cronbach's alpha	Mean	SD	Range
INT	3	.87	6.55	0.79	4-7
ATT	4	.81	5.74	1.03	3.5-7
BB X OE	11	-	5.93	3.37	-3.27-13.36
SN	3	.06	2.48	0.96	1-5.33
NB X MC	8	-	-1.67	2.95	-10.50-5.50
PBC	4	.17	6.46	0.60	5-7
CB x P	5	-	.07	3.76	-7.80-13.20

Note. N = 85. Intention (INT), attitude (ATT), subjective norm (SN), perceived-behavioural-control (PBC), behavioural beliefs multiplied by outcome evaluations (BB x OE), normative beliefs multiplied by motivation to comply (NB x MC), and control beliefs multiplied by perceived power to influence behaviour (CB x P).

³³ Further participant details can be found in the extended results chapter C.12.1., and in Extended Appendix O for enhanced information.

³⁴ The removal of a certain item within the PBC scale achieved the highest Cronbach's alpha possible (to improve reliability). However, the purpose of removing an item from the PBC scale significantly reduced the models predictive ability (accounted variability explained) of intention. Therefore, it was decided to leave the items in for the analysis above (see extended results section C.9.1., for a further discussion).

Table 5 below presents bootstrap Pearson's correlations between the TPB measured variables. Bias correlated and accelerated bootstrap 95% Confidence Intervals (CIs) are reported in square brackets. Notably, only attitude, PBC and behavioural beliefs were significantly correlated with intention.

Table 5

Correlations between measured variables for steroid-users

	INT	ATT	SN	PBC	BB x OE	NB X MC	CB X P
INT	-	-	-	-	-	-	-
ATT	.385*** [.146, .588]	-	-	-	-	-	-
SN	.026 [-.167, .186]	.037 [-.188, .235]	-	-	-	-	-
PBC	.240* [.014, .449]	.374*** [.178, .573]	-.105 [-.336, .126]	-	-	-	-
BB x OE	.250** [.063, .427]	.340*** [.139, .520]	.176 [-.009, .339]	.213* [-.051, .479]	-	-	-
NB X MC	.058 [-.124, .245]	.117 [-.066, .293]	.247* [.036, .440]	.082 [-.132, .293]	-.001 [-.214, .192]	-	-
CB X P	.033 [-.150, .205]	.094 [-.106, .276]	-.020 [-.201, .180]	.099 [-.159, .326]	.232* [.041, .402]	-.124 [-.343, .111]	-

Note. $N = 85$. [BCa bootstrap 95% confidence intervals based on 1000 samples].

* $P < .05$, ** $P < .01$, *** $P < .001$, two-tailed. Intention (INT), attitude (ATT), subjective norm (SN), perceived-behavioural-control (PBC), behavioural beliefs multiplied by outcome evaluations (BB x OE), normative beliefs multiplied by motivation to comply (NB x MC), and control beliefs multiplied by perceived power to influence behaviour (CB x P).

Table 6 below presents the unstandardised regression coefficients (B), standard errors (SE B), standardised regression coefficients (β), semi-partial correlations squared (sr^2), R^2 , adjusted R^2 and R^2 change after entry of the direct and indirect measures (IVs).

Table 6

Predicting intention for steroid-use with attitude (ATT), perceived-behavioural-control (PBC) (STEP 1), and behavioural beliefs multiplied by outcome evaluations (BB x OE) (STEP 2)

Predictor and step	<i>b</i>	SE B	β	(sr^2)	R^2	Adjusted R^2	R^2 change
Step 1					.16	.14	.16
Constant	4.08 (2.16, 5.97)	0.96					
ATT	0.27 (0.99, 0.44)	0.08	.34**	0.10			
PBC	0.15 (-0.09, 0.42)	0.13	.11	0.01			
Step 2					.17	.14	.01
Constant	4.17 (2.27, 6.04)	0.94					
ATT	0.24 (0.06, 0.41)	0.08	.31*	0.07			
PBC	0.13 (-1.23, 0.38)	0.13	.10	0.01			
BB X OE	0.03 (-0.01, 0.08)	0.02	.13	0.01			

Note. $N = 85$. (BCa bootstrap 95% confidence intervals based on 1000 samples). * $P < .05$, ** $P < .01$, *** $P < .001$, two-tailed.

A robust hierarchical multiple regression was run to predict³⁵ intention to use steroids. The results highlight that R was significantly different from zero at the end of step 1. With attitude and PBC in the equation these variables significantly predicted an individual's intention to use steroids, $F(2,82) = 7.735, p < .001, R^2 = .159$, and accounted for 16% of the explained variability. Notably, the bootstrap for coefficients highlighted that the predictor variable attitude was the only independently significant variable for predicting intention, whereas PBC was not significant.

After step 2, the inclusion of behavioural beliefs added to prediction of intention to use steroids did not result in a significant increment in $R^2 = .172, F_{\text{inc}}(1, 81) = 2.50, p > .05$. Similarly, the bootstrap for coefficients highlighted that the only independently significant predictor variable for predicting intention was attitude. Therefore, this pattern of results suggests that of the explanatory variables modelled here, the (direct) attitude measure is the strongest independent predictor of intention – among other variables associated with intention (as demonstrated by zero-order correlations) there is considerable overlapping variances, meaning that these do not emerge as *independent* predictors of intention. Although the inclusion of PBC along with the inclusion of behavioural beliefs slightly contributed to the final variability of the model, this was not significant. Exploration of the squared semi-partial correlations in Table 3 highlights the value of the predictors of intention. Each of these values were squared to retrieve the unique variance in intentions that can be accounted for by each of the predictor variables. The findings conclude that attitude independently explains nearly 7% of variance in intention, with behavioural beliefs and PBC independently explaining around 1% each. This leaves a total figure of 8% of variance in intention explained by shared variance/overlap between these variables (based on R-squared of 17%, subtracting the 9% that is uniquely accounted for by one of these variables alone). Therefore, from these analyses it is evident that attitude is the most important component for explaining intention. The adjusted $R^2 = .14$ is relatively similar to the initial R value, which indicates that the model's estimate of accounted variance is generalisable to other steroid-using populations.

³⁵ References to 'prediction' are used in the statistical sense, but that models are cross-sectional (i.e., models 'predict' or explain outcome variance in terms of concurrent measures) rather than prospective (i.e., models do not examine predictions over time).

Research Question 2.

Table 7 below summarises the descriptive statistics for the full sample, and for steroid-users and non-steroid-users based on their responses regarding each of the factors within the TPB. It also includes an internal consistency analysis, Cronbach's alpha.³⁶

Table 7

Descriptive statistics, number of items (N), Cronbach's alpha, mean scores, standard deviations for the full sample, and for steroid-users and non-steroid-users, of all the variables included in this analysis

Constructs	N	Cronbach's alpha	Mean scores (SD)	
			Full sample (N = 160)	Steroid-users (N = 85)
INT	3	.96	3.95 (2.84)	6.55 (0.79)
ATT	4	.97	3.69 (2.35)	5.74 (1.03)
BB X OE	11	-	2.62 (4.82)	5.93 (3.37)
SN	3	.43	1.87 (0.99)	2.48 (0.96)
NB X MC	8	-	-5.81 (5.71)	-1.67 (2.95)
PBC	4	.62	4.95 (1.82)	6.46 (0.60)
CB x P	5	-	-.60 (3.31)	.07 (3.76)

Note. N = 160. INT = intention; ATT = attitude; SN = subjective norm; PBC = perceived-behavioural-control; BB x OE = behavioural beliefs multiplied by outcome evaluations; NB x MC = normative beliefs multiplied by motivation to comply; and CB x P = control beliefs multiplied by perceived power to influence behaviour.

Correlations between the different direct TPB measures are presented in Table 8, and correlations for the indirect TPB measures are presented in Table 9.

Table 8

Correlation coefficients among the direct TPB predictor variables for the full sample

	ATT	SN	PBC
ATT	-	-	-
SN	.634** [.548, .714]	-	-
PBC	.862*** [.822, .899]	.585*** [.502, .663]	-

Note. N = 160. [BCa bootstrap 95% confidence intervals based on 1000 samples]. ATT = attitude; SN = subjective norm; PBC = perceived-behavioural-control.

* P < .05, ** P < .01, *** P < .001, two-tailed.

³⁶ It was deemed inappropriate to remove any items within the subjective norm and PBC scales, as the process would not sufficiently improve the Cronbach's alpha (to improve reliability) (see extended results section for a further discussion C.10.8).

Table 9

Correlation coefficients among the indirect TPB predictor variables for the full sample

	BB x OE	NB X MC	CB X P
BB x OE	-	-	-
NB X MC	.674*** [.598, .747]	-	-
CB X P	.247** [.097, .381]	.146*** [-.003, .284]	-

Note. $N = 160$. [BCa bootstrap 95% confidence intervals based on 1000 Samples]. BB x OE = behavioural beliefs multiplied by outcome evaluations; NB x MC = normative beliefs multiplied by motivation to comply; and CB x P = control beliefs multiplied by perceived power to influence behaviour.
 * $P < .05$, ** $P < .01$, *** $P < .001$, two-tailed.

Direct measures of the TPB. The results (Table 10) indicate that the full model containing all direct TPB predictors was statistically significant, $\chi^2(3, N = 160) = 216.12, p < .001$, indicating that the model could differentiate between steroid-users and non-steroid-users. The model explained between 71% (Cox & Snell R square) and 99% (Nagelkerke R Square) of the variance in steroid-use, and correctly classified 98.8% of the cases. Only two of the predictor variables made a statistically significant independent contribution to the model. These significant differences existed between the two groups for attitude and PBC (therefore, attitude and PBC depended on whether participants intended to use steroids or not, after controlling for subjective norms). The predictor variable attitude recorded an odds ratio of 16.81. This indicates that for every single unit increase in (pro-steroid) attitude, the odds of being a steroid-user (versus a non-user) were nearly 17 times greater. Similarly, the predictor variable PBC recorded an odds ratio of 13.03, indicating that for each single unit increase in PBC (i.e., higher level of positive control and factors that enabled steroid-use), the odds of being a steroid-user (versus a non-user) were 13 times greater.

Table 10

Logistic regression of steroid-use with the TPB direct measures

Included	<i>b</i>	<i>Lower</i>	95% CI for Odds Ratio	
			<i>Odds</i>	<i>Upper</i>
Constant	-25.48 [-.128.92, -29.08]			
Attitude	2.82*** [.76, 62.73]	.13	16.81	2241.38
Subjective Norms	1.30 [-24.57, 45.72]	.00	3.66	28668.33
PBC	2.57** [-.04, 82.98]	.03	13.03	5828.45

Note. [95% BCa bootstrap confidence intervals based on 10000 samples]. $R^2 = .03$ (Hosmer & Lemeshow) .71 (Cox & Snell) .99 (Nagelkerke). Model $\chi^2(1) = 216.12$, $p < .001$. * $p < .05$. ** $p < .01$. *** $p < .001$, two-tailed.

Indirect measures of the TPB. The results (Table 11) indicate that the full model containing all indirect TPB predictors was statistically significant, $\chi^2(3, N = 160) = 158.41$, $p < .001$, which also indicated that the model could differentiate between the two groups. The model explained between 63% (Cox & Snell R square) and 84% (Nagelkerke R Square) of the variance in steroid-use, and correctly classified 93.8% of cases. Only two statistically significant independent differences were identified between the two groups for behavioural and normative beliefs after controlling for control beliefs. The predictor variable normative beliefs recorded an odds ratio of 1.71. This indicates that for every single unit increase in normative beliefs (i.e., a greater perception of positive/supportive social norms), the odds of being a steroid-user (versus a non-user) were nearly 2 times greater. Comparably, behavioural beliefs recorded an odds ratio 1.48, indicating that for each unit increase in behavioural beliefs (i.e., a perception of positive outcomes resulting from steroid-use), the odds of being a steroid-users (versus a non-user) were nearly one and a half times greater.

Table 11

Logistic regression of steroid-use with the TPB indirect measures

Included	<i>b</i>	95% CI for Odds Ratio		
		<i>Lower</i>	<i>Odds</i>	<i>Upper</i>
Constant	2.01 [.22, 104.78]			
BB x OE	.39*** [.20, 32.61]	1.20	1.48	1.82
NB X MC	.54** [.24, 49.70]	1.35	1.71	2.17
CB X P	.04 [-.31, .34]	.84	1.04	1.30

Note. [95% BCa bootstrap confidence intervals based on 1000 samples]. BB x OE = behavioural beliefs multiplied by outcome evaluations; NB x MC = normative beliefs multiplied by motivation to comply; and CB x P = control beliefs multiplied by perceived power to influence behaviour. $R^2 = 29.40$ (Hosmer & Lemeshow) .63 (Cox & Snell) .84 (Nagelkerke). Model $\chi^2(1) = 158.41$, $p < .001$. * $p < .05$. ** $p < .01$. *** $p < .001$, two-tailed.

Discussion

This study aimed to examine the application of TPB variables to account for the variation in intention to use steroids. The study also explored the differences between steroid-users and non-steroid-users in terms of the TPB variables (i.e., differences in explanation of actual past or current behaviour, and predictions of future intentions within the steroid-user group).

Research Question 1³⁷

The overall model (at step 2), which included attitude, PBC and behavioural beliefs accounted for 17% of the explained variability in an individual's intention to use steroids. However, the model was not statistically significant and the only variable that significantly predicted intention was attitude. Therefore, an individual's positive attitudes towards steroid-use explained approximately seven times more variance in intention than PBC and behavioural beliefs. However, it is worth noting that the initial model (at step 1), including only attitude and PBC, accounted for 16% of the explained variance in an individual's intention to use steroids, which was also a statistically significant model. Similarly, attitude was the only significant predictor variable contributing to the model and explained approximately ten times more variance in intention than PBC.

³⁷ See extended discussion chapter D.3., for a further discussion regarding research question 1.

In several studies that have used Ajzen's theory of planned behavior, attitude has consistently been reported to produce the strongest influence on intention (Ajzen, 1991; Armitage & Conner, 2001; McEachan et al., 2011), and is further supported by Munro (1991), whose work found that attitude was somewhat predictive of steroid-use. This finding appears logical, as instrumental attitude is attributed to a perceived advantage of using steroids (e.g., beneficial), and affective attitude mirrors an individual's feelings (e.g., enjoyment) towards steroid-use. Therefore, the more approving an individual's attitude (instrumental and/or affective) is towards steroid-use, the greater the likelihood that he will engage in the behaviour.

The results have also shown that although the indirect measure, behavioural beliefs, fractionally contribute to intention, it is not significant or the most influential factor pertaining to steroid-use. Therefore, indirect beliefs do not contribute over and above variance captured in 'attitude' - given that indirect beliefs are correlated with outcome, this suggests that relationship is (almost) fully mediated by direct attitude³⁸, which could be considered consistent with the TPB theory. Nonetheless, steroid-users reported a perceived increased likelihood that steroid-use would help achieve a desirable outcome, and outcome evaluations regarding the total number of consequences was judged favorably. For example, an individual's steroid-use is associated with expected enhancement of his appearance (Nilsson, Spak, Marklund, Baigi & Allebeck, 2005), an increase in muscle size and strength (Nilsson, Baigi, Marklund & Fridlund, 2001), and an increase in his athletic ability (Lambert, Titlestad & Schwellnus, 1998).

Similarly, despite PBC partially contributing to intention, it was not significant. However, PBC is generally reported in the literature to be a good predictor of a variety of health-related behaviours (Armitage & Conner, 2001; Godin & Kok, 1996; McEachan et al., 2011) and steroid-use (Allahverdipour et al., 2012; Enaker, 2013). Therefore, it could be hypothesised that the reason PBC is not predictive of steroid-use may be the result of the construct's poor reliability (low internal consistency) due to rigidity of the fixed items as operationalised by the authors (Ajzen & Fishbein, 1980; Francis et al., 2004). Alternatively, it may be the result of not selecting the most

³⁸ See extended discussion chapter D.3.1., for a further discussion regarding behavioural beliefs and attitudes towards steroid-use as well as a mediation analysis.

appropriate combination of items within the construct as it is multifactorial and measures two separate entities, (1) self-efficacy (e.g., feelings of confidence and ease of steroid-use) and (2) controllability (e.g., decision to use steroids is in their control and whether they use steroids is entirely up to them). Nevertheless, Ajzen (2006) argues that despite clear evidence highlighting the distinction between self-efficacy and controllability, there remains sufficient commonality between the items and therefore they should be retained within the construct. This content warrants further exploration within the population. Finally, only the self-efficacy items significantly correlated to intention irrespective of the consistently high mean scores across all of the individual PBC related items. As all steroid-users report positive PBC (ranging from 5-7, Mean of 6.46, SD of 0.60), when such a variable is fairly fixed/invariant it will not be able to predict variability in outcomes (i.e., intention to use steroids within the following 6 months), which may help to explain poor PBC predictive performance.

Overall, the current results support the application of the TPB to explore the antecedents of substance use and contribute to the growing literature from other studies that have used this model (see Armitage & Connor, 2001). The results from this study are not consistent with McEachan et al.'s (2011) meta-analysis which found that the TPB variables can explain 44.3% of variance in intention or Allahverdipour et al.'s (2012) study which found that the TPB variables accounted for 63% of the variance in intention to use steroids. However, it was similar to the findings of Enaker's (2013) study, which found that the TPB variables explained 15% of the variance in intention to use steroids. Nevertheless, this finding implies that future research is needed to explore the question of whether the reduced predictive power of this model is a consequence of the measure, the actual theory, or is related to the outcome behaviour.

Research Question 2

The results show that both of the separate full models containing all of the direct and indirect predictor variables were statistically significant. This indicates that both models were able to differentiate between steroid-users and non-steroid-users. The direct TPB model outperformed the indirect TPB model as it correctly classified 98.8% of the cases and between 71% and 99% of the variance in steroid-use. Group membership (steroid-user versus non-user) was more strongly predicted by attitudes, with steroid-users unsurprisingly having positive attitudes towards steroid-use, whereas

the opposite relationship was found for non-steroid-users. This finding appears consistent within the existing literature when comparing both groups' attitudes towards steroid-use (e.g., Chng & Moore, 1990). Furthermore, the finding appears logical, as a steroid-user would have stronger instrumental and/or effective attitude (as discussed above) towards steroid-use. Conversely, non-users instrumental attitude is attributed to a perceived disadvantage of using steroids (e.g., harmful), and their affective attitude mirrors their feelings (e.g., unenjoyable) towards steroid-use. However, there is a possibility that this attitude is constructed to justify behaviour (when prompted by questionnaire) rather than that the attitude is driving behaviour. Based on this (cross-sectional) study alone, it is unclear whether the associations between attitude and behaviour reflect attitudes driving behaviour or behaviour driving attitudes (attitudes could be epiphenomenal to influence of past behaviour on current/future behaviour). The suggestion that attitudes might influence the likelihood of future behaviour is based on (1) tenets of the TPB and (2) empirical evidence from prospective longitudinal studies that support an attitude-intention-behaviour sequence.

Group membership was also strongly predicted by PBC, with steroid-users having a higher level of perceived positive control (i.e., reflecting their confidence that they were capable of using steroids) when compared with non-steroid-users. Strikingly, unlike in question 1, PBC varied more widely across the combined (user and non-user) sample and demonstrated greater explanatory value with respect to whether respondents were users or non-users.

Subjective norm was unrelated to group membership, which suggests that there was little difference between the groups regarding social pressures and the opinions of important people in relation to steroid-use. Interestingly, these findings are consistent with the existing research that has found that the subjective norm construct is the weakest predictor of intention across a range of health-related behaviours (Armitage & Conner, 2001). Several authors (e.g., Sparks, Shepherd, Wieringa & Zimmermanns, 1995) have consequently removed subjective norm from their analyses. We can speculate that this may be the result of the rigidity of the fixed items as specified within the manual, due to the constructs poor reliability as well as the construct being multifactorial, and actually measuring two separate contributing pressures (i.e., social pressures and the opinions of important people). Alternatively, given the topic of interest, the fact that both groups reported overwhelmingly social pressures opposed to

steroid-use serves as a good explanation for why subjective norm is a weak predictor of intention.

The indirect TPB model correctly classified 93.8% of the cases, and between 63% and 84% of the variance in steroid-use. Interestingly, group membership was most strongly predicted by normative beliefs, with non-steroid-users perceiving a much stronger negative social pressure (i.e., a belief that most other people, family members, and partners would disapprove/think that they should not use steroids), than did steroid-users. Therefore, both groups had a perception that influential others wanted them to not use steroids and they felt a general motivation to comply with these significant others. Interestingly, the referents' own beliefs may be driven by strong negative public perceptions of steroid-use, which portrays the steroid-user in a negative light (e.g., harming their personality and social image) (Sagoe, Huang, Molde, Andreassen & Pallesen, 2015). Notably, normative beliefs may be tapping more into group norms here (i.e., sensitivity to specific reference groups that individual identifies with) rather than broad societal norms. This may be why direct norms are actually less explanatory than indirect norms in these models – i.e., indirect norms may be more sensitive to differential weights given to reference groups (motivation to comply) and nuance of group norms versus societal norms. Finally, group membership was strongly predicted by behavioural beliefs, with steroid-users perceiving an increased likelihood of desirable outcomes and favourable evaluations regarding the total number of consequences of steroid-use and thus maintaining their behaviours. Conversely, the opposite relationship was found with non-steroid-users as, their beliefs and fears of the negative side-effects of steroid-use carries more weighting over the advantages

Strengths and Limitations³⁹

This study is the first to explore the application of the TPB to recreational gym-users (steroid-users and non-users) in the UK, and therefore contributes to an under-researched area. Based on our findings, the TPB may help to explain individuals' future intentions of steroid-use, highlighting the strength of the model's applicability to a range of unique behaviours within different contexts (Ajzen, 2011), and therefore continues to receive substantial research support.

³⁹ See extended discussion chapter D.6.1., for more strengths and D.6.2., for additional limitations of this study.

However, our findings need to be understood within the context of this study's limitations. For example, given that steroids are a prescription only-medication may have led to some participants withholding information about their steroid-use. Furthermore, participants' awareness of being studied may have led to changes in their responses. Regarding recruitment and the two types of questionnaire, participants in the study may have had either strong pro-steroid attitudes (steroid-users) or strong anti-steroid attitudes (non-users). This possibly represents two groups that are at extremes and questions how well they represent those who may be more ambivalent about use. This implies that the results cannot fully generalise to individuals who are less motivated to engage in research (Bilic, 2005). In spite of these limitations, self-administered questionnaires have been shown to elicit reduced social desirability bias when compared with alternative methods, such as telephone and personal interviews (Aquilino & Losciuto, 1990). Although the TPB constructs were able to differentiate these known groups (steroid-users or non-users), it remains unclear whether the TPB constructs actually predict or influence steroid-use. It could be that differences reflect post-hoc explanations or rationalisations for behaviour. For example, it is unclear whether increases in favourable behavioural beliefs might predict/precipitate steroid-use or whether steroid-use could be reduced by decreasing favourable behavioural beliefs. Furthermore, despite the statistical significance of this study's findings, which can differentiate between sampled groups, it should not be the central driver for clinical interpretation of this study's outcomes for application to future groups (users and non-users) (Page, 2014). At present clinical interpretation of the findings to ascertain those individuals who may be at risk of using steroids in the future is in its infancy and caution should be applied. This is partially attributed to the fact that the TPB measure was not explicitly designed to be a risk-screening tool, and we cannot draw strong inferences based on these findings without conducting further research and therefore it remains unclear what the clinical value is. Nevertheless, it is hypothesised that the TPB measure does possess some clinical utility in the future as discussed below.

The cross-sectional design and self-selected sample may have impacted on the generalisability of the current findings as data were only collected at one point and those individuals who participated may not have been representative of each (steroid-using and non-using) group. In order to address these limitations, it may be advantageous to

replicate this study. This may be achieved by recruiting using the same method or exploiting different avenues and collecting data at various time points. Other than replicating recruitment or seeking broader and more widely representative samples, it will be worthwhile to conduct a prospective or longitudinal follow-up study to ascertain whether intentions are predictive of future behaviours in order to understand the long-term value of this model.

Clinical Implications⁴⁰

Steroid-misuse is a form of substance abuse that may bring about psychological and physiological health-related issues. This study applied psychological theory concerned with how an individual's attitudes, subjective norms, PBC and their corresponding underlying beliefs regarding steroid-use influences intention to use or not use steroids. These findings could be utilised within clinical practice, allowing practitioners to deliver assessment, consultation and treatment to steroid-users who may experience clinical presentations (e.g., body dysmorphic disorder) that may have developed from a 'quest of masculinity' (Pope, Gruber, Choi, Olivardia & Phillips, 1997). For example, for individuals who want to stop using steroids the measure could be used during an assessment by facilitating discussion around certain beliefs, which may be unhelpful. A clinical psychologist may be able to guide an individual to foster more helpful beliefs that supports behavioural change within this model. Findings from this study have shown that an individual's behavioural beliefs strongly influence his attitudes and subsequently his intention, which precede behavioural outcomes.

Future Research⁴¹

This study provides further support for the application of the TPB to help explain health-related behaviours (Ajzen, 1991), but it has also identified that this psychological model alone is not sufficient to fully explain the underlying processes involved when an individual chooses to use or not use steroids. Therefore, in future research it may be advantageous to integrate other influential variables that are derived from existing research (e.g., importance of health, personality) and extend the TPB model. For example, the way emotions can influence intentions was not explored within this framework and during the decision making process. Nevertheless, research from

⁴⁰ See extended discussion chapter D.7., for more clinical implications.

⁴¹ See extended discussion chapter D.8., for more information regarding future research.

other TPB studies (e.g., focusing on smoking) included anticipated regret as an extension of the TPB components and found that it influenced an individual's intention to refrain from smoking (Conner, Sandberg, McMillan & Higgins, 2006) or to continue smoking (McMillan, Higgins & Conner, 2005). Therefore, exploration of these positive and negative emotions may help to account for additional variance concerning an individual's steroid-use or non-use.

Conclusion⁴²

This study provides evidence that the application of a psychological model, namely the TPB, can be useful in understanding future intentions towards steroid-use or non-steroid-use, and can also account for differences (in beliefs and perceptions) between steroid-users and non-users. Psychological theories may also be generalisable to different social behaviours and populations, and they may provide insight into the antecedents of behaviour and possible avenues of intervention leading to behaviour change. The findings from this research suggest that interventions should be directed at changing habits and beliefs about the outcomes of steroid-use. Despite these findings, there remain conceptual and methodological issues when operationalising items within particular constructs (e.g., subjective norm and PBC) of the TPB measure. These challenges will need to be resolved when using this measure as a vehicle to understand and predict whether an individual will perform or not perform a given behaviour in the future.

⁴² See E.1., in the extended paper for critical reflections, including E.1.1., for personal motivations for this research, E.1.2., for theoretical considerations, and E.1.3., for epistemological and methodological considerations.

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Extended Paper

Extended Background Literature Chapter

A.1. Introduction

This section outlines a history about steroid-use, the Governmental legislation of steroid-use in the UK, why individuals use steroids, patterns of steroid-use, associated risks, prevalence, public health relevance and current harm reduction programmes. It will also provide an overview of attitudes-behaviour theories and an overview of the Theory of Planned Behaviour (TPB), including a review of the literature that has applied this model to other health-related behaviours. It will then focus on the TPB application to steroid-use. Finally, it will offer a rationale for this study.

A.1.1. A History of Anabolic Androgenic Steroids-use

In 1935, testosterone was isolated, characterised and synthesised into an injectable testosterone esters and an orally active form. Testosterone quickly became widely researched within clinical arenas, and was superseded by the establishment of steroids in both oral and injectable forms in the 1950's (Advisory Council on the Misuse of Drugs [ACMD], 2010). Clinically, they have been legally prescribed for the treatment of diseases such as cancer and HIV/AIDS to treat the resultant loss of lean muscle mass due to the related wasting syndrome. They have also been used to treat conditions such as male hypogonadism (delayed puberty developed from steroid hormone deficiency), anaemia, and to stimulate bone growth (National Institute on Drug Abuse, 2012). Competitive athletes increasingly noticed the potential benefits of steroids, and have sought to enhance their athletic ability and body's physique.

As people have engaged in competitive sports, they have endeavoured to gain advantages over their adversaries and have adopted a "win at all costs" mentality (Evans, Weinberg & Jackson, 1992). The use of performance enhancing drugs in sports has occurred since the original Olympic Games of ancient Greece (Lee, 2006). Since the 1950's, male elite athletes began to use steroids for competitive sports, and by the 1960's, their use had become widespread at both national and international levels (Korkia, 1996). In the

1970s, the International Olympic Committee banned steroids, however, this did not prevent their use. By the 1980's, "doping" became a controversial issue at the Olympic Games, as well as at other sporting events. Drug testing was then introduced into several sports, which exposed several famous athletes (e.g., Ben Johnson), who failed drug tests and that were subsequently banned from competing (Drug Scope, 2006). However, the use of steroids within elite sports only represents a small percentage of the total number of users within the overall population (McVeigh & Evans-Brown, 2009). Indeed, the use of steroids has also been associated with weightlifting (Bahrke, Yesalis & Wright, 1990), bodybuilding (Kanayama, Pope & Hudson, 2001) and non-competing athletes (Goulet, Valois, Buist & Côté, 2010). It has also filtered through into professional sports teams, and extended further in fitness centres and gyms in a growing black-market for steroids (McVeigh & Evans-Brown, 2009). In the UK, thousands of individuals use steroids as a fundamental component of their training, mainly with the aim of enhancing their body's physique in the pursuit of obtaining society's idealised male mesomorphic body composition (Williamson, 1993), which is becoming more of a public health concern.

A.1.2. Governmental Legislation

Steroids are controlled as Class C substances under the Misuse of Drugs Act (1971) and have restricted legitimate use in the UK. Steroids are prescription-only drugs and therefore can only be prescribed by a suitable practitioner. There is no penalty for possession, and it is legal to import or export steroids that are meant for personal use as a medicinal product (i.e., steroids are allowed to be marketed as they have properties to treat or prevent diseases). However, it is illegal to possess, import or export steroids with intent to supply others. Additionally, manufacture without a licence could lead to a maximum penalty of 14 years in prison and/or an unlimited fine (ACMD, 2010). Although the current legislation acts as a potential barrier to non-prescribed steroid-use, it still appears that users are able to circumvent these laws.

A.1.3. Why do Individuals use Steroids?

As discussed in the Journal Paper, there are several reasons why individuals use steroids. Some people use them to enhance their athletic ability.

Among athletes steroid-use is estimated to be in use by approximately 6%, according to surveys, though these figures may be an underestimation. Furthermore, new designer drugs are being developed to avoid detection from testing procedures, which may potentially increase an athlete's temptation to cheat (National Institute on Drug Abuse [NIDA], 2006). Research suggests that some adolescents and young men use steroids to increase their muscle size because they suffer from a body dysmorphic disorder (i.e., distorted image of their bodies). This is also known as a "reverse anorexia", where they do not see themselves as being physically big or strong enough even though they are large and muscular (Pope, Katz & Hudson, 1993). Male steroid-users therefore often report body image concerns (Kanayama, Pope & Hudson, 2001). Individuals that suffer from body-image disorders may become dependent on steroids for their anabolic effects because of pathological concerns about muscularity (Kanayama, Brower, Wood, Hudson & Pope, 2010). Alternatively, individuals who are susceptible to dysphoric withdrawal effects might continually recommence steroid-use to self-medicate and treat these effects (Tan & Scally, 2009); however, more research is needed to confirm this phenomenon.

Another potential pathway to dependency may come about as a result of the reinforcing effects of steroids experienced by several individuals over a period of time due to their hedonic or direct rewarding properties (Frye, 2007). Alternatively, some users report that they started to use steroids to increase their muscle size in order to cope with personal insecurities, such as memories of childhood physical or sexual abuse. They believed that being physically bigger and stronger would prevent future attacks because others would find them intimidating (NIDA, 2006). As stated above, there has been an increase in steroid-use for aesthetic reasons, partly because of increased societal pressures on men to achieve the 'ideal' male physique (Mishkind, Rodin, Silberstein & Striegel-Moore, 1986). More recently, this phenomenon has gained additional empirical support. Choi, Pope and Olivardia (2002) found that men in today's society are feeling increased pressure to have muscular physiques (e.g., well defined abdominal muscles, large biceps), and many believe that steroid-use would help to facilitate their quest of achieving this male ideal (Grogan, 2008). Increased access to the internet has contributed to the

circulation of media images representing the ideal male physique (Pickett, Lewis & Cash, 2005). This has led to an increase in anxiety in some men as these images leave them feeling physically inadequate (Leit, Gray & Pope, 2002). Other studies have suggested that individuals use steroids purely to enhance their physique in order to look more attractive to potential partners (Chng & Moore, 1990), and this trend appears to parallel society's progressive sexualisation of men in contrast to more traditional gender roles (Leit et al., 2002). Despite these findings, Grogan (2008) argues that there is limited existing data from the UK, and researchers should therefore exercise caution in applying available data to a UK sample.

A.1.4. Patterns of Steroid-use and Associated Risks

A study by Cohen (2009) revealed that the internet is the most popular place to purchase steroids. This is potentially due to steroid-users circumventing the need for a legitimate prescription, however, the risk of buying counterfeit steroids or not receiving anything is high. Steroids are mostly used in patterns called 'cycling' where they may be taken for a particular period of time (e.g., 6-12 weeks) representing an 'on' cycle. An 'off' cycle involves a similar period of steroid-free training. The rationale for this cyclical process is driven by the belief that it will prevent steroid tolerance, and that it will reduce the risk of side-effects associated with prolonged use (ACMD, 2010). For example, the androgenic effects of steroids suppress the hypothalamic-pituitary-gonadal (HPG) axis, which may lead to hypogonadism (decreased production of testosterone) (Tan & Scally, 2009). During this drug-free period, the HPG axis can recover and therefore restore natural testosterone production after a few weeks or months. However, users may take human chorionic gonadotropin (to increase sperm count in men) at the end of the cycle to speed this process up (Llewellyn, 2009). Without taking these precautionary measures, hypogonadism may cause physiological side-effects such as loss of sexual drive and function (Tan & Scally, 2009). Steroid withdrawal has also been linked to depression (Brower, 2002).

There has been a sharp increase in the number of steroid-users attending needle exchange and syringe programmes across the country.

However, this has presented new challenges for the healthcare practitioners as they may have limited formal knowledge about the steroid-using group and are ill equipped to attend to their needs. Researchers such as Evans-Brown, McVeigh, Perkins and Bellis (2012) have indicated that some individuals are using steroids that are not a genuine pharmaceutical grade. Furthermore, individuals may use multiple substances simultaneously in a routine known as 'stacking' (e.g., using both oral and injectable steroids together) for their complex training routines, which they believe will have additional benefits (i.e., steroids will interact to produce an enhanced effect on muscle size that is more effective than taking them individually) (Lenehan, McVeigh & Bellis, 1996). However, there is limited evidence to support the beneficial properties of stacking. Other studies have shown that some users may use doses that are considerably in excess of therapeutic guidelines (Kanayama, Hudson & Pope, 2008). There is also evidence to suggest that steroids may be used with various other supplementary drugs such as human growth hormones and insulin (Lenehan et al., 1996). Further evidence suggests that some users also use other illicit drugs such as cocaine and amphetamines (McVeigh et al., 2007) as well as the recreational use of prescription medications (McCabe, Brower, West, Nelson & Wechsler, 2007), which highlights polydrug use by a number of users.

As outlined in the Journal Paper, research into steroid-misuse has highlighted a number of negative health consequences. Additional side-effect include cardiovascular dysfunction (Nottin, Nguyen, Terbah & Obert, 2006), mania, acute acne, increased irritability, psychosis, and homicidal violence known as 'roid rage' (Su et al., 1993; Yesalis & Bahrke, 1995). Although the majority of harmful effects are not deadly, a few deaths were associated with liver damage and connected with long-term use (ACMD, 2010) and suicide (Middleman, Faulkner, Woods, Emans & DuRant, 1995). Most, though not all of the detrimental effects of steroid-use are reversible after discontinuing the use of the drug. The vast majority of users inject steroids, which may lead to various serious consequences which include infections (e.g., abscesses) and damage to the injection site due to poor injecting technique, and blood-borne viruses such as HIV and hepatitis as a result of sharing vials and reusing injecting

equipment (ACMD, 2010). Therefore, it could be hypothesized that for the majority of users the benefits and motivating factors of steroid-use clearly outweighs the potential health-related consequences. However, this warrants further exploration.

A.1.5. Prevalence of Steroid-use in the UK

Irrespective of the illegality associated with steroid-use, individuals still choose to use them. Approximately one percent of 16 to 59 year olds⁴³ have reported using steroids in their lifetime (Ramsey, Baker, Goulden, Sharp & Sondhi, 2001), with 66,000 reporting taking them in the previous year (Home Office, 2014). Although the data indicates a statistically significant drop in recorded steroid “lifetime” use between 1996 and 2002/03 (from 1.1%, to 0.5%), there was also a statistically significant increase for “lifetime” use between 2003/04 and 2013/14 (from 0.6%, to 0.8%). Interestingly, steroid-use has been reported in the survey more frequently than other illicit substances (e.g., heroin, methadone, crack cocaine, opiates and methamphetamines), which highlights its growing popularity. There is a striking gender difference in reported steroid-use with a male to female ratio ranging from 3:1 to 10:1. Several studies have reported that the median age for steroid-use is between 22 and 25 years of age (Chng & Moore, 1990; Lindström, Nilsson, Katzman, Janzon & Dymling, 1990). Individuals who use steroids are suggested to be more likely to participate in physical exercise more frequently and for longer periods of time than non-users (Lindström et al., 1990). However, these statistics are only an estimation since it is difficult to ascertain with certainty the number of individuals who have used steroids for non-medical purposes. For example, several steroid-users may have been reticent to disclose their use for the survey, and the fact that it was a household survey meant that it did not contain information from specific locations such as prisons (ACMD, 2010). Nonetheless, there is evidence of increased prevalence as more steroid-users have recently been attending needle and syringe services than in previous years (McVeigh, Beynon & Bellis, 2003).

⁴³ For the brevity of this thesis, information regarding prevalence rates in adolescents and schoolchildren are not included.

Despite the only available evidence of the current prevalence of steroid-use being derived from the British Crime Survey and needle and syringe programmes across the UK (which indicates a low rate of steroid-use), the evidence itself does not provide a true representation of the actual rates of use amongst particular segments of society. For example, there remains a pervasive use of steroids for aesthetic reasons that are not associated with any sporting endeavours (Bolding, Sherr & Elford, 2002). Certainly, the dominant discourse suggests that a large percentage of steroid-use is associated with gyms and health clubs, especially with those individuals focusing on bodybuilding and attending the more 'hardcore' gyms when compared with mixed and fitness gyms (Lenehan, McVeigh & Bellis, 1996). Findings from Lenehan et al's (1996) study, which was conducted in gyms in the Northwest of England, revealed that 50.7% of 'hardcore' gym members engaged in lifetime steroid-use, while the figures for mixed and fitness gyms were 31.9% and 15.1% respectively. Korkia and Stimson (1993) also conducted a large-scale study across 21 gyms, and reported that 1.4% of women and 6% of men were current users of steroids. The above findings highlight the growing trend of individuals using steroids.

A.1.6. Public Health Relevance and Current Harm Reduction Programmes

While there have been several studies investigating the prevalence of steroid-use, there appears to be a dearth of research pertaining to steroid-use or non-use in relation to an individual's attitude, subjective norm, perceived-behavioural-control and underlying beliefs. It is evident that certain individuals are at greater risk than others in today's society. Despite the UK's legislation against the use of steroids, the fact that prevalence rates continue to increase indicates that the legislation has been somewhat ineffective. Furthermore, existing literature suggests that other types of illegal drugs are pushed into the black-market, where there are no regulating standards regarding their production, and this makes them potentially more dangerous (Fish, 2006). As steroid-use is a conscious decision made by a person, it is a behaviour that may be modified through preventative programmes. However, preventative programmes conducted in the USA on high-school varsity football players did not alter their intention to use steroids or their actual use (Goldberg, Bents,

Bosworth, Trevisan & Elliot, 1991). Furthermore, the authors suggest that the use of 'scare' tactics was counterproductive as this process actually, in many cases, increased an individual's positive attitudes towards steroid-use.

Therefore, alternative approaches may be more advantageous, as discussed below.

In the UK, there is currently an absence of recognised drug treatment programmes for steroid-users, and this has paved the way for harm reduction programmes to fill this void and become the dominant force for health interventions (National Treatment Agency for Substance Misuse [NTA], 2006). The NTA welcomes the National Institute for Health and Clinical Excellence (NICE) public health guidance published in 2009, which endorses the schemes currently provided by needle exchange and syringe programmes, pharmacies and GP practices in England to reduce harms (e.g., blood-borne viruses, Hepatitis C and HIV) caused by injecting drugs. The NICE guidance has provided information regarding the best practices and treatments for staff working within the NHS and with local authorities (including the wider public and voluntary sectors) about the significance of the needle exchange and syringe programme role in reducing the harms caused by injecting drugs. Since these initiatives were introduced, the number of steroid-using service-users to engage in needle exchange and syringe programmes has significantly increased (Bolding, Sherr, Maguire & Elford, 1999). However, there remains limited research into the efficacy and cost-effectiveness of these services for steroid-users (NICE, 2009). Nevertheless, these sites have become popular places for steroid-users to obtain sterile injecting equipment and clear communication is crucial when devising interventions (NICE, 2014). For example, these harm reduction programmes may be used as a means to provide educational materials such as leaflets and booklets to steroid-users to help to engage in harm-minimisation (e.g., safer injecting practices) (ACMD, 2010).

A.1.7. Research into Attitudes-Behaviour Theories

The concept of attitudes and the influence they have on an individual's behaviour has been examined in psychological research for decades. Earlier definitions were inclusive and encapsulated cognitive, affective, motivational

and behavioural components (see Allport, 1935). In 1969, Wicker reviewed the literature, examined the relationship between attitude and behaviour and concluded that it is unlikely that attitudes predict behaviour. This encouraged social psychologists to enhance the predictive power of attitudes. The concept of attitude was subsequently reduced to its evaluative component and defined an individual's attitudes in terms of "likes and dislikes" (Bem, 1970, p. 14). Furthermore, Eagly and Chaiken (1993) later defined attitudes as "a psychological tendency that is expressed by evaluating a particular entity with some degree of favor or disfavor" (p.1). Although attitudes may be treated as a hypothetical concept because they do not have an apparent measurable structure, it is suggested that they can be examined by measuring an individual's observable responses reflective of his or her attitudes (e.g., responses on a self-reported questionnaire or their behaviour towards an object or person) (Ajzen, 2005). Notably, measuring attitudes is context dependent, and variations in question wording and format may have a significant impact on the responses given (Sudman, Bradburn & Schwarz, 1996) and must be taken into consideration when designing questionnaires for research.

Since Wicker's review, researchers have begun to develop integrative theories (models) that have included supplementary determinates of behaviour such as social norms or intentions (Olson & Zanna, 1993). Usually, the focal points of these theories are the motivational components underlying a person's decision to perform or not perform a given behaviour. There are several well-established motivational models. However, for the brevity of this study, they are summarised below. They include the Social Cognitive Theory (SCT; 1986); the Health Belief Model (HBM; Janz & Becker, 1984); the Protection Motivation Theory (PMT; Rogers, 1985), which expanded the HBM; the Theory of Reasoned Action (TRA; Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975) and the Theory of Planned Behaviour (TPB; Azjen, 1988; 1991), which is an expansion of the TRA.

The similarities of these models are that they target cognitive factors during the process of behaviour change. They operate on the premise that attitudes and beliefs, including an individual's expectations of future situations

and outcomes, are influential antecedents of health-related behaviour (Gebhardt & Maes, 2001). Furthermore, these models suggest that a person will choose a particular action that will increase the likelihood of a positive outcome. However, as with all theories they have limitations. For example, these theories fail to comprehensively address the aetiology of beliefs and how these beliefs may impact on other behaviours. Furthermore, they only focus on a single threat and prevention behaviour while ruling out the possibility of additional threats that may compete for an individual's attention (Weinstein, 1988). Nevertheless, these models have been developed to help predict, explain and change certain health-related behaviours.

Comparative research that has examined the models has found the TPB to be a more powerful predictor of intentions and behaviour than the HBM, PMT, and SCT (Armitage & Conner, 2000; Quine, Rutter & Arnold, 1998). Similarly, Hausenblas, Carron and Mack (1997) found that the supplementary constructs within the TPB enhances its predictive power to greater effect than the TRA. Furthermore, Armitage and Conner's (2000) analysis of the HBM, PMT, and SCT found that the models usually accounted for a small-to-medium amount of the variance explained in behaviour, whereas research investigating the variance explained by the TPB in intention and behaviour revealed large effect sizes⁴⁴ (Armitage & Conner, 2001; Godin & Kok, 1996). Various reasons may explain the TPB dominance over the other models. For example, the model provides definitions and descriptions that are more explicit regarding the specified constructs. TPB also includes a discriminate validity of the constructs (Armitage & Conner, 2000).

Several of the criticisms directed towards the HBM also relate to the PMT. For example, the PMT suggests that a person is a rational information processor, however, it does not account for habitual behaviours (e.g., brushing teeth), or acknowledge social and environmental factors (e.g., opportunities to exercise), and neither does it explain how attitudes might change (Schwarzer, 1992). Therefore, these models were deemed unsuitable for this present study.

⁴⁴ Based on Cohen's (1988; 1992) classification of effect sizes (i.e., small 0.10, medium 0.30 and large 0.50).

Similarly, the SCT was deemed unsuitable given that its wide-ranging focus made the theory difficult to operationalise. It could be argued that the most extensively researched of these theories are the TRA and the TPB, both of which were therefore considered for this study.

A.1.8. From the Theory of Reasoned Action to the Theory of Planned Behaviour

The TRA assumes that intention is the direct antecedent of behaviour (Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975). Furthermore, Ajzen (1991) argued that behavioural intentions are supposed to include the motivational components that drive a form of behaviour. These components indicate the extent to which a person is willing to try to carry out a behaviour. As discussed in the Journal Paper, intention is determined by attitude and subjective norms, which in turn have their own antecedents and corresponding underlying beliefs. For example, each behavioural belief relates a particular behaviour to a clear outcome or to another attribute (e.g., the cost obtained from carrying out the behaviour). It is also worth noting that a person's attitude towards a behaviour is driven by the strengths of those beliefs that are pertinent at the time, and is based on the Expectancy-value Theory (see Fishbein & Ajzen, 1975).

Nevertheless, Ajzen (1988) acknowledged that the TRA was developed specifically to focus on volitional behaviours where a successful execution of behaviour requires only the formation of an intention. Therefore, in order to cater for behaviours that require an individual's control over the behaviour such as their own assets or environmental antecedents of behaviour, Ajzen (1998) developed a theoretical model that attended to the problem of incomplete volitional control. Thus, the TPB (see Figure 5) is an extension of the TRA that includes a measure of perceived-behavioural-control (PBC), which is a variable that has acquired a large amount of interest in social cognitive models developed to explain and predict health-related behaviours (e.g., HBM, PMT; Armitage & Conner, 2000). Ajzen (1991) defined PBC as representing the understanding that a person has about how easy or difficult it is to perform a given behaviour, which is also determined by its own antecedents and corresponding beliefs. Furthermore, PBC is purposed to affect behaviours by

either influencing the intention to perform the behaviour or by influencing the behaviour directly, which provides a factual account of the actual control. Therefore, the easier a behaviour is to execute, the more likely he or she will intend to carry it out. However, when a person has incomplete volitional control (e.g., reducing alcohol consumption or cessation), the inclusion of perceived control provides insight into the prediction of a behaviour (Ajzen & Madden, 1986). Ajzen (1991) reported that the significances of attitude, subjective norm, and PBC in the prediction of intention are likely to fluctuate between different behaviours and situations. For example, in a situation where an individual's attitudes are powerful, or where subjective norms are influential, PBC may have a reduced predictability of intentions. Finally, Ajzen suggests that the target behaviour should be defined carefully in terms of its Target, Action, Context and Time (TACT), which can then be measured, either through self-reporting or direct observation. Therefore, in this study, the main target is steroids, the action is the intention to use or not use steroids, the context is recreational male gym-users and the time is over the next 6 months.

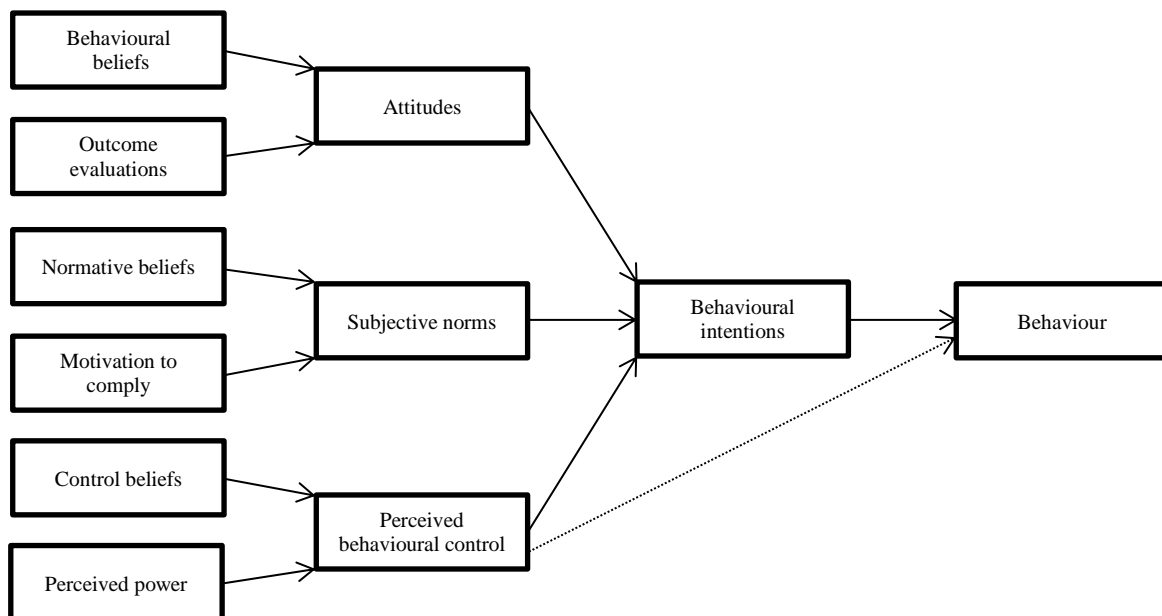


Figure 5. The Theory of Planned Behaviour (Ajzen, 1988; 1991)

The main reason the TPB was chosen for this study was its superiority over other models, as well as the fact that it is an evolution of the TRA with fewer limitations. Furthermore, the TPB is most widely used social cognitive

model within health psychology (Godin, Conner & Sheeran, 2005). The TPB variables attitude, subjective norms, PBC, behavioural, normative and control beliefs were used to help understand and explain an individual's intention for steroid-use or non-use.

A.1.9. The Theory of Planned Behaviour and Steroid-use – a Review of Previous Research

Reviews have indicated that the TPB has been relatively effective when predicting a variety of health-related behaviours (e.g., Conner & Sparks, 1996; Manstead & Parker; 1995), and this finding has been backed up by meta-analyses (e.g., Ajzen, 1991; Godin & Kok, 1996). Nevertheless, these meta-analyses have received some criticism regarding their sampling and scope. Ajzen's (1991) meta-analysis of the TPB concluded that the mean multiple correlation of attitude, subjective norm and PBC, with intention of $R = .71$, and a mean multiple correlation of $R = .51$ for prediction of behaviour from intention and PBC. Despite the reported findings, the analysis examined direct determinants of intention and behaviour, and was based on several unpublished studies and a limited data set. Godin and Kok's (1996) meta-analysis concluded that PBC provided an average supplementary 13% and 12% of the variance in intentions and behaviour, respectively. However, they only considered health-related behaviours, and reported values that were obtained from studies that provided relevant information. Notably, these examples indicate that some authors feel inclined to report only significant findings, which may have invariably inflated the reported values. More recently, a meta-analysis of 185 studies conducted by Armitage and Conner (2001) across diverse domains reported that the TPB model accounted for 39% of the variance in intentions and 27% of the variance in behaviour. Additionally, attitude was found to be the strongest predictor of intention ($R^2 = .24$), followed by PBC ($R^2 = .18$), subjective norms ($R^2 = .12$), and intention was more strongly related to behaviour ($R^2 = .22$), than PBC ($R^2 = .13$). However, this meta-analysis was conducted on studies before 1998 and therefore omits research that is more recent. Finally, a meta-analysis conducted by McEachan, Conner, Taylor, and Lawton (2011) on 200 studies found that attitude, subjective norms and PBC can explain 44.3% of variance in intention and 19.3% of the variance in behaviours. In relation to the

previous meta-analyses, attitude was also the strongest predictor ($B = 0.35$), followed by PBC ($B = 0.34$) and subjective norms ($B = 0.15$). Although the amount of variance captured in the prediction of intention was comparable to existing reviews (e.g., Armitage & Conner, 2001), the variance captured in the prediction of behaviour was less. Furthermore, the efficacy of the TPB has been shown to vary depending on what type of behaviour is being examined. Nevertheless, for the purpose of this study the focus will only be on intentions and not behaviour.

The TPB has been utilised to explain intentions and behaviours in the context of steroid-use (e.g., Allahverdipour, Jalilian & Shaghaghi, 2012; Enaker, 2013; Jalilian, Allahverdipour, Moeini & Moghimbeigi, 2011). However, Jalilian et al. investigated how TPB was used to assess the ability of participants to abstain from steroid-use during a preventative intervention programme and will not be discussed here. Enaker's (2013) study investigated the factors that were associated with steroid-use among 121 males aged 18-30 who did not participate in intercollegiate athletics, but were recruited in gyms in Kentucky, USA. Of the 121 participants, nine (7.4%) reported that they intended to use steroids within the next year and seven (5.9%) reported that they were currently using steroids. An ANOVA analysis revealed that PBC ($p=.029$) was found to be the strongest predictor variable in relation to the participants' intentions to use steroids. Attitude ($p=.060$) was the second strongest predictor variable, and subjective norm had the weakest correlation ($p=.349$). Notably only PBC was found to be the only statistically significant predictor variable. Furthermore, the eta-squared results highlighted that 10.1% of the variance concerning intention could be explained by PBC, while 4.9% could be explained by attitude and 0% could be explained by subjective norms. Therefore, participants of this study perceived a greater ease concerning PBC in relation to steroid-use than what might be true in reality. In relation to attitudes, participants strongly believed that steroid-use would help them achieve their desired goals, and the majority of participants felt pressure to agree with the social norm (i.e., that their friends and family would disapprove of their steroid-use).

However, there were several limitations with this study. For example, the study did not use a formative approach when developing the survey, as recommended by Ajzen. For example, in most circumstances a content analysis would have been conducted after obtaining participants' open-ended responses, thus allowing the researcher to use the most frequent responses to construct the survey and may have reduced the theory's predictive ability (Ajzen, 2002).

Allahverdipour et al.'s (2012) study explored how the TPB explained cognitive factors associated with steroid-use among young bodybuilders. Two hundred and fifty-three males (62 steroid-users) from Hamadan, Iran participated in the study and their age ranged from 15 to 28. A hierarchical multiple regression analysis was used to explain the variance in steroid-use with the TPB variables. The TPB predictor variables, attitude, subjective norms, and PBC accounted for 63% of the variance in intention to use steroids, $F(3,247) = 138.96, p < 0.001$. Notably these figures were considerably higher than those of previous meta-analyses, both of which explored the TPB predictor variables in relation to intention (e.g., Armitage & Conner, 2001; McEachan et al., 2011). However, the authors acknowledged that there might be some multicollinearity between the predictor variables, and the sample was relatively young. Furthermore, while intention towards steroid-use correlated with positive attitudes towards steroid-use ($r = 0.66$) and subjective norms ($r = 0.61$), it was inversely correlated with PBC ($r = -0.69$). An explanation for this is that the PBC variable in this study was designed to measure the strength of an individual's confidence that he is capable of 'not' using steroids, which does not follow Ajzen's recommendations for the development of the construct. Nevertheless, these findings are similar to Enaker's (2013) study in which PBC was the strongest predictor of intentions, followed by attitude and subjective norms.

As discussed above, there are several limitations with the above studies. Moreover, the fact that they all had small homogeneous sample sizes, together with the linguistic barriers (specifically in relation to Allahverdipour et al.'s study), the theoretical issues and the cultural differences limit the value of the used surveys with regard to application in the UK. It is also important to be

mindful that the TPB variables might vary across other health-related behaviours (Ajzen, 1991). Therefore, caution should be applied when comparing other studies and meta-analyses that are conducted on other behaviours with the findings from studies conducted on steroid-use.

A.1.10. Rationale for Research

The following sections aim to extend on the descriptions provided in the Journal Paper. Currently there have been no previous published studies using the TPB to explain an individual's intention towards steroid-use or non-use among male recreational gym-users in the UK. Additionally, since there continues to be an increase in the number of young men who are now using steroids, research into this growing trend is timely.

A.1.11. Theoretical and Clinical Implications

The TPB will provide a strong theoretical framework for this study. As the model focuses on an individual level it is an appropriate model to help explain what factors influence intentions. Furthermore, it will examine attitudes, subjective norms and influential social pressures, which are subject to change over time in society, and how these factors influence a person's intention to use or not use steroids. Therefore, what may have been a social norm several years ago may not be the current norm, and the same is true of attitudes regarding a particular behaviour. Furthermore, investigating how steroid-users overcome barriers is necessary. As the TPB is an applied psychological model, it is important that it should be tested and revised through a process of falsification. This process will reveal if the model is relevant and suitable to be used within research and clinical practice. Therefore, this study will also test the validity and reliability of the TPB with regard to its application to a range of health-related behaviours.

Theory-based research is required to help practitioners comprehend the relationships between particular factors and health-related behaviours. For example, the findings from this study may help healthcare professionals develop insight into specific attitudes and beliefs that influence a person's intention to use or not use steroids. Moreover, it may help to develop harm-

reduction programmes, awareness programmes, educational programmes and specific psychological interventions to challenge unhelpful beliefs of those who are deemed to be at risk of harm (Chng & Moore, 1990). Although there is a limited evidence base for psychosocial treatments for steroid dependence (Pope & Brower, 2008), research derived from psychosocial treatments involving different drugs has shown effectiveness (e.g., Carroll & Onken, 2005), and therefore may be applied to steroid dependence. Carroll et al. (2006) proposes that steroid abusers may initially benefit from motivational interviewing to encourage commitment to therapy, including contingency management, and behavioural couples therapy, since women may experience abuse from their steroid-using male partners (Choi & Pope, 1994). Furthermore, clinical psychologists are sufficiently trained to approach this addiction in the same manner in which they approach similar addictions to other drugs and alcohol. The existing literature indicates that some individuals may experience depression and suicidal thoughts after the cessation of the drug, and clinical psychologists will be well placed to offer therapy to help address these clinical presentations.

A.1.12. Extended Aims

Pilot/Elicitation Study

This study explored first-hand experiences of steroid-users' attitudes and motivation towards using steroids. It also explored whether and how societal or individual pressures and barriers or facilitators influence their decisions to use steroids.

Main Study

This study aimed to examine the application of TPB variables (attitude, subjective norms, PBC and their respective underlying beliefs) to account for the variation in intention to use steroids. Intention indicates an individual's readiness to carry out a given behaviour and is assumed to be the direct antecedent of behaviour, which is subject only to *actual* behavioural control (e.g., opportunity). The study also explored the differences between steroid-

users and non-steroid-users in terms of the TPB variables (i.e., differences in explanation of actual past or current behaviour, and predictions of future intentions within a steroid-user group), as well as their underlying beliefs towards steroids.

The study addressed five questions across a two-phase mixed methods design.

Phase One: Pilot/Elicitation Study

Research question 1 (deductive). Can explanations of steroid-use be accounted for in terms of the TPB framework?

Research question 2 (inductive). How do steroid-users explain their use of steroids? (i.e., In particular, do they identify (novel) explanatory factors that are not accounted for by the TPB framework alone?).

These questions were addressed via a survey with open-ended questions, designed to elicit responses that pertain to different domains of the TPB. Content analysis was used to construct a TPB questionnaire based on these responses. Further to serving as a pilot study for constructing a TPB questionnaire, the questionnaire allowed for identification of non-TPB factors that are relevant to steroid-users' accounts of their behaviour.

Phase Two: Main study

Research question 1. Within self-identified steroid-users, to what extent can future intention to use steroids be accounted for in terms of attitudes, subjective norms, PBC and their respective underlying beliefs? (i.e., to what extent can the TPB be usefully applied to steroid-use?).

Research question 2. To what extent can steroid-use versus non-use be accounted for by variables within the TPB? (i.e., comparing steroid-users with non-steroid-users).

Research question 3. How do steroid-users and non-steroid-users differ in their underlying beliefs with respect to steroid-use?

Phase one (research questions 1 and 2) focused directly on a steroid-using population. Phase two research question 1 focused on a steroid-using population, whereas research questions 2-3 compared steroid-users with non-steroid-users.

Extended Methodology Chapter

B.1. Overview

This section outlines the mixed methodology utilised in this study (exploratory sequential design), which consisted of two individual phases. An initial qualitative phase was followed by a quantitative phase to investigate the original findings within the same population. The descriptions of each phase in the Journal Paper were limited due to a strict word count, and it was decided to only focus on the quantitative phase within the Journal. The theoretical framework for this research utilised the TPB, and the methodological framework was based on the Francis et al. (2004) manual for constructing questionnaires based on the TPB.

The rationale for this design is discussed, followed by the first author's epistemological position and consideration of the ethical issues pertaining to both phases of this study. Firstly, the methodology of the of the qualitative phase is fully presented in detail, followed by the methodology of the quantitative phase as presented in the Journal Paper which is extended.

B.2. Design

There have been few studies (e.g., Kraska, Bussard & Brent, 2009) that have used mixed methodologies; however, this may be because research into steroid-use is still a growing area. Therefore, the initial qualitative exploration of steroid-use was considered an essential component since these results would inform the development of the TPB questionnaire to further investigate the qualitative findings with a larger sample group. This is known as an exploratory sequential design as adapted below in Figure 6: (Creswell & Piano-Clark, 2011).

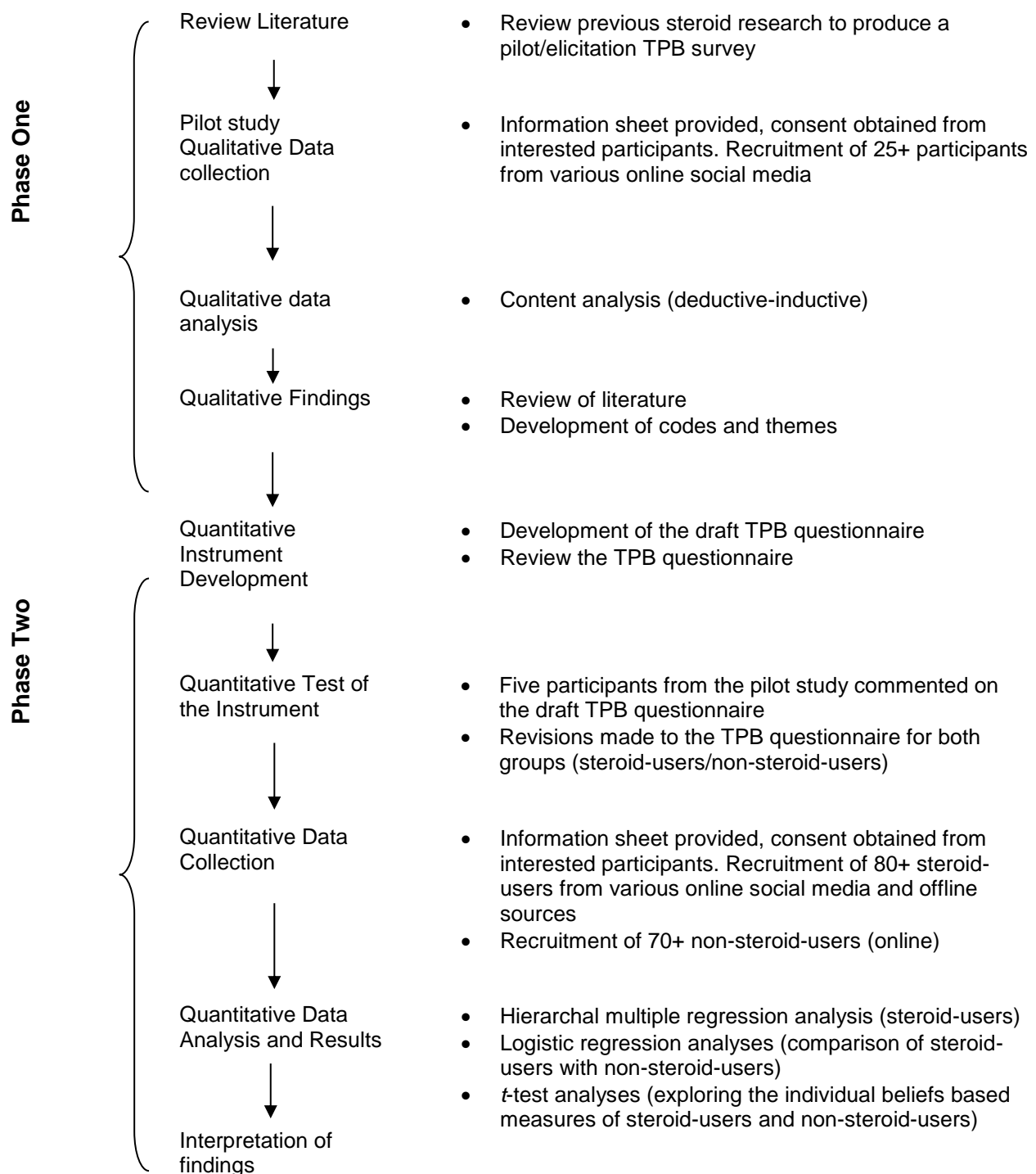


Figure 6. Process flow chart for the different phases of the study

The TPB has adopted an exploratory sequential design, which is positioned upon the proposition that an exploration is required for several reasons. For example, existing instruments or measures are not accessible and the variables are unknown. In particular, this design is advantageous when a researcher wants to develop and test an instrument, partly because there are no existing measures, and also because extant instruments are not appropriate for an investigation into the phenomenon of interest (Creswell et al., 2011). Therefore, this design seemed appropriate to the current research problem (i.e., testing).

The strength of the exploratory sequential design relates to its two-phase structure, especially as only one type of data is collected during each phase (Greene, Caracelli & Graham, 1989). However, there are a number of challenges that also exist with an exploratory sequential design. For example, considerable time is required by the researcher to implement the two-phased approach and it is therefore important to consider this factor when devising the study's plan (Creswell et al., 2011).

All methodologies, including mixed methodologies, can possess advantages and disadvantages. Using both qualitative and quantitative methods during data collection and analysis can enhance the methodology and strengthen the study (Onwuegbuzie & Leech, 2005). For example, qualitative research can provide contextual information and in-depth understanding about an individual's experience, and can also provide an open developmental phase (deductive-inductive) to inform the quantitative phase with more theory-testing generalisability. Conversely, quantitative research tests can validate already constructed theories and hypotheses, though it may miss contextual and individual experiences, particularly when developed without a more open, exploratory preliminary phase (Creswell et al., 2011). Therefore, the advantage of a mixed methods design is its ability to balance efficient data collection and analysis with data that provides contextual information to enhance understanding and interpretation of the quantitative information. However, the challenge of a mixed methods design is that the two data collection methods complement rather than duplicate each other (ACET, Inc., 2013).

B.3. Epistemology

Historically, qualitative and quantitative approaches have had different underlying philosophical assumptions that have guided the researchers understanding about the nature of social reality (i.e., ontology) and how they come to know this reality (i.e., epistemology). Therefore, the researchers understanding of the different ontological and epistemological assumptions subsequently informs the development of the methodology (Harrits, 2011). Traditionally in qualitative approaches, researchers identify themselves with an interpretivist perspective and ontologically assume that social reality is constructed by social actors, and that this social reality is continuously constructed in local situations (Gall, Gall & Borg, 1999). Researchers are interested in how individuals perceive, interpret and operate within their worlds (Krathwohl, 1998), as well as interacting with what is being investigated (Creswell, 1994). In contrast, in quantitative approaches, researchers usually identify with positivism (or post-positivism), using the practices of the natural sciences, including the scientific method, and ontologically assumes that social reality is an objective and external reality (Gall, Borg & Gall, 1996) and out there to be discovered (Krathwohl, 1998). In this approach, researchers endeavour to remain independent of what is being investigated (Creswell, 1994).

Krathwohl (1998) suggests that all research falls along a continuum with qualitative research on one end and quantitative research on the other. Furthermore, Johnson and Onwuegbuzie (2004) suggest that differences between the approaches philosophical assumptions in each approach imply that the methodologies are incompatible. Some authors (e.g., Holmes, 2006) believe that different paradigms or worldviews have rigid boundaries and therefore cannot be mixed, maintaining a purist stance (see Rossman & Wilson, 1985). Guba and Lincoln (2005) have argued for the relaxing of these boundaries and proposed that components of certain paradigms may be carefully integrated in a study. Furthermore, pragmatists such as Tashakkori and Teddlie (2003) have argued that researchers should endeavour to use the most suitable methods to obtain optimum results, even if this means alternating between different paradigms. Some writers (e.g., Caracelli & Greene, 1997) have suggested that multiple paradigms may be used in mixed methods studies, though it is

important for each paradigm to relate to a different phase of a research design (Creswell et al., 2011). For example, a mixed methodology study using an exploratory sequential design begins with qualitative phase reflecting a more interpretivist position whilst understanding multiple perspectives; however, in the next quantitative phase, the underlying assumptions shifts to a postpositivist stance to guide the researcher whilst they identify and measure statistical trends (Creswell et al., 2011). Alternatively, Harrits (2011) proposes that one set of assumptions may be selected for the entire study in which one methodology is given priority.

Critical realism was originally developed by Bhaskar (1978) and offers a radical and alternative philosophical perspective, or middle ground, to the paradigms of positivism and interpretivism (McEvoy & Richards, 2003). For the critical realist, phenomena studied in scientific research are not constructed exclusively in the scientists' 'minds'. Rather, they relate to real entities and the personal experiences, meanings and the reality of the participants, whilst taking into consideration the differing contexts where they occur, which exist independently of the researcher (Cook & Campbell, 1979). This implies that the idea of reality exists, however, we can never know for certain, and all our understandings are ultimately provisional (Barker, Pistrang & Elliot, 2002). The fundamental objective of critical realism is not to identify the generalisable laws found in positivism, or to identify the individual experiences found in interpretivism, but to develop deeper levels of explaining and understanding of a phenomena whilst shifting from individual experiences to the underlying processes (known as retrodution) (McEvoy & Richards, 2003).

This study's research aims were to explore and examine psychosocial factors associated with adult male steroid-use among gym-users. The critical realist is not concerned with predicting behaviour, but endeavours to gain a deeper understanding of a perceived reality, and thereby acquire the tools to influence social behaviour (Zembylas, 2006). A critical realist perspective seemed appropriate after reviewing the literature pertaining to an individual's experiences of steroid-use, which appears to be varied and dependent on the individual, the context, as well as other influential factors. Furthermore, there

appears to be several endorsed themes that have emerged from the data, which implies common underlying processes. McEvoy and Richards (2003), argue that a critical realists' choice of methodology should be directed by the ontological nature of the investigated phenomenon, instead of their previous experiences and methodological interests. Similarly, Olsen, (2002) also argued that the determining choice when selecting research methods should be guided by the research problem and it is suggested that the most effective approaches uses mixed methodologies. Therefore, the TPB exploratory sequential design appeared well orientated within a critical realists' perspective as it utilised retroduction: beginning with the qualitative lens focusing on the lived experience of the steroid-user and shifting to a quantitative exploration of their underlying processes.

B.4. Ethical Considerations

This study was conducted in accordance with the ethical principles of the University of Lincoln, School of Psychology Research Ethics Committee (REC) guidance, British Psychology Society (BPS) Code of Human Research Ethics (BPS, 2010), Department of Health Research Governance Framework for Health and Social care (2005) and the REC for Addaction.

In phase one, this study was reviewed and approved by the University of Lincoln REC panel. A favourable decision was received from a member of the REC panel. A chairs action was then sought to review amendments during the development of the pilot questionnaire (e.g., to review the revised wording and phrasing of some of the questions), which was approved (see Appendix B).

In phase two, a further chairs action was sought during the development of the TPB questionnaire, which was also approved (see Appendix B). Running parallel to this, Addaction's REC panel made a favourable decision with conditions. These revisions were given a favourable opinion and were approved (see Appendix C). A final chairs action was sought after adaptations were made to the TPB questionnaire to make it suitable for non-steroid-users where it received a favourable decision (see Appendix B).

B.4.1. Privacy and Confidentiality

In phase one, no personal identifiable information was collected. The questionnaire was anonymous and participants were required to provide a pseudonym and the first four digits of their date of birth in the eventuality that they needed to contact the first author. The questionnaire was password protected and only accessible by the chief investigator. The questionnaires were exported from Survey Gizmo onto a password-protected laptop and were only accessible to the chief investigator. All data during the study were transferred onto an encrypted memory stick, and will be stored at the University of Lincoln for seven years after the completion the study, and will then be destroyed. In phase two, the same procedure was followed as above for the online version of the questionnaire.

B.4.2. Informed Consent and Participant Information

The nature of the study was clearly outlined on the participant information sheet (see Appendix D) before the questionnaire was presented. Participants were encouraged to contact the chief investigator or his research supervisors if they had any concerns pertaining to their participation in the study. Participants were also signposted to local services (e.g., GP or a support resource website) for further information if required. Notably, no participants sought advice or expressed any concerns with the chief investigator and their supervisors throughout the duration of the study. As the study was an online web-based questionnaire and used a self-selecting sample, meant that the first author could not regulate who participated in the research. Nevertheless, participant completion of the questionnaire was an indication of their informed consent during both phases (see Appendix E).

B.4.3. Adverse Events and Withdrawal from the Study

In phase one, the researcher was aware that certain questions were of a sensitive nature, and that participants may have found them distressing. Participants were made aware via the information sheet that they did not have to answer all of the questions. In both phases, participants were informed that they could withdraw from the study at their own request at any point of the study

without reason. Participants could also request to have any of their data destroyed within two weeks after the completion of the questionnaire by contacting the chief investigator. However, the data could only be withdrawn within the first two weeks post-participation as the data would subsequently be analysed.

B.5. Phase One: Qualitative Methodology - Elicitation/Pilot Study

B.5.1. Pilot Recruitment

Access to the questionnaire (Survey Gizmo) was facilitated by a hyperlink that was accessible across various social media platforms such as on the researchers' Facebook account and on bodybuilding forums. Some participants known by the researcher were also emailed directly. The researcher provided an explanation of the research and encouraged their friends and family to share the post on their own Facebook accounts. The process of sharing the post was intended to attract additional interested participants, thus creating a snowball effect. Snowball sampling can introduce an increased risk of perceived coercion (social pressure to participate). To counter this, the study information sheet emphasised voluntariness and made clear that it was acceptable to withdraw from the study at any point. Moreover, the questionnaire was anonymous, and participation (or non-participation) could not be tracked back to originating sources or individuals. 44 of those who accessed the information sheet for the study did not subsequently participate in the research, and 2 withdrew part-way through the questionnaire. This indicates that many individuals exercised their autonomy with respect to participation, therefore assuaging concerns about potentially undue influence of the snowball approach. Additionally, the researcher recruited from websites and made contact with eight administrators of bodybuilding forums in order to ask permission to advertise on their sites (see Appendix F for recruitment messages). Six websites consented to hosting the questionnaire within their forums: (1) <http://www.uk-muscle.co.uk>, (2) <http://www.musclelounge.co.uk>, (3) <http://www.tmuscle.co.uk>, (4) <https://thinksteroids.com>, (5) <http://www.naturalmuscle.co.uk> and (6) <http://www.muscletalk.co.uk>, who also

advertised it on their website. The researcher also reposted on the forums and on Facebook to enhance recruitment. Recruitment occurred from 26th October to 28th December 2013.

B.5.2. Participants

74 people accessed the questionnaire from the various social media platforms. 28 participants (37.8%) completed the questionnaire, with two people (2.7%) partially completing the questionnaire. Data from these two participants was excluded from the analysis.

B.5.3. Sample Size and Justification

A total of 25 participants were required for the elicitation/pilot phase, which involved content analysis. A sample of this size has been found to be adequate for achieving content saturation in previous structured elicitation studies (e.g., Ajzen, 2006), and is recommended by Godin and Kok (1996) and is guided by the principles of qualitative research methods. A sample of this size should be *sufficient* for the more inductive aspect of the study, given that the sample is purposefully selected and somewhat homogeneous. For example, participants were purposively sampled for their interest in the subject matter. This helps to justify sample size, as less-selective or more heterogeneous samples can require larger numbers.

B.5.4. Inclusion Criteria

All recruited participants were male and were aged 18 years or over. All participants were required to be currently using injectable and/or oral steroids. Participants were required to communicate by writing in the English language since it was not viable to translate the materials into other languages due to limited resources. Finally, participants were required to be able to give informed consent to take part in the study as well as having access to use a computer and the internet for the online version of the questionnaire.

B.5.5. Exclusion Criteria

Any individual who did not meet the inclusion criteria was excluded from the study. Nevertheless, they were still thanked for their interest in participating.

B.6. Elicitation/pilot TPB Questionnaire

The first author used the manual “Constructing questionnaires based on the theory of planned behaviour” (Francis et al., 2004) when developing the pilot TPB questionnaire (see Appendix G). The manual was specifically designed for health service researchers, psychologists and non-psychologists wishing to predict and understand behaviour. TPB is a psychological model of behaviour change allowing the researcher to produce an effective questionnaire to measure the TPB constructs (Francis et al., 2004).

Section one of the questionnaire contained 22 questions exploring various demographics (e.g., age, ethnicity, educational attainment), including questions exploring participant steroid-use (e.g., steroid preference, amount consumed on a typical course and heaviest use) and training routines (e.g., frequency of gym attendance). This section was developed by the first author and his research supervisors (NGM & RdN). Items included within this section were identified via an earlier literature review by the chief investigator after reviewing existing measures of drug use (e.g., National Drug Strategy Household Surveys, 2013; Waterhouse, 1993).

Section two required the participants to complete nine fixed TPB open-ended questions, as specified by the manual, relating to direct measures of all three predictor variables (attitude, subjective norms, and PBC). Three questions related to the participant’s attitude towards steroid-use, for example, *“What do you believe are the advantages of using steroids?”* and *“What else comes to mind when you think about using steroids?”* Three questions assessed subjective norms (social pressures from reference groups) towards steroid-use, for example, *“Please list the individuals or groups who would approve or think you should use steroids?”* and *“What else comes to mind when you think about other people’s views about your use of steroids?”* Three questions assessed PBC, for example, *“Please list any factors or circumstances that would make it easy or enable you to use steroids?”* and *“Are there any other issues that come to mind when you think about using steroids?”* A further 11 open-ended questions were developed by the chief investigator and his research

supervisors (NGM and RdN). These items explored participants beliefs about non-TPB factors that are relevant to steroid-users' accounts of their behaviour (e.g., *"Why did you start to use steroids?"* and *"How do you feel about your body?"*).

B.6.1. Procedure

After obtaining ethical approval, participants from a steroid-using population were recruited across various social media platforms. Participants accessed the online questionnaire using 'Survey Gizmo'. A participant's information sheet was available on the introduction page that laid out the aims of the study. The BPS (2006) guidelines on internet-mediated research and NHS National Research Ethics Safety (2011) guidance on understanding completion of questionnaires as an act of consent were adhered to. Therefore, consenting participants were directed to a page to create a personal identification code to maintain anonymity. The code also allowed them to withdraw their data from the study up to two weeks after completion of the study. Participants were directed to section one of the questionnaire, followed by section two, before reaching the debrief page. However, participants that did not wish to provide consent were free to close the questionnaire.

B.6.2. Debriefing

All participants were debriefed after participating in this research. Participants were provided with the chief investigators and his research supervisors contact details in the eventuality that they needed to make contact at a later date. Participants who indicated that they wanted a summary of the research findings on the consent page will receive a copy on the completion of this research (see Appendix H).

B.7. Content Analysis

The specific method recommended to generate themes for the questionnaire was content analysis. The objectives of qualitative content analysis are to make replicable and valid, context-based assumptions from the data with the intention of obtaining knowledge, original insights, facts and developing a practical framework for future action (Elo & Kyngäs, 2008). The

goal of qualitative content analysis is to uncover and understand the “meanings, intentions, consequences, and context,” of a research question (Elo & Kyngäs, 2008, P. 108). Content analysis permits the use of data to be derived from both qualitative and quantitative sources within the same study (Mayring, 2014), which also aligns with a critical realist perspective.

Qualitative content analysis can be used in an inductive or deductive manner. Both inductive and deductive approaches involve three main phases: (1) preparation, (2) organisation, and (3) reporting of results. During the preparation phase, data is collected, made sense of, and the unit of analysis is selected. In inductive content analysis, the organisation stage consists of open coding, creating categories and abstraction (Elo & Kyngäs, 2008). Conversely, in deductive content analysis, the organisation phase consists of developing a categorization matrix (i.e., coding frame), through which the data are reviewed for content and coded for similarities and differences to the identified categories (Polit & Beck, 2012). Finally, the reporting phase involves the results being described by the content of the categories representing the phenomenon from using either the deductive or inductive approach (Elo & Kyngäs, 2008). This study used a mixture of both an inductive and deductive content analysis during the development of items for the TPB questionnaire. For example, the inductive method allowed the researchers to formulate categories and decide, through a process of interpretation as to which things to put in each category (Dey, 1993). The deductive method, based on the TPB framework (theoretical constructs) and literature reviews, was consulted to support the development of a coding frame as well as help to code the data corresponding to the respective categories (Polit & Beck, 2004).

Items used to measure TPB constructs should be developed from the beliefs of participants who have completed the questionnaire (Ajzen, 1991). The TPB manual did not clearly explain how the researchers can resolve discrepancies during the analysis stage or whether they should compute inter-rater reliabilities. Similarly, since the TPB manual does not explicitly outline all of the steps within the content analysis, the recommendations suggested by

Graneheim and Lundman (2004) relating to trustworthiness (i.e., outlining the steps involved from data collection to the reporting of results) were followed. Notably, Graneheim and Lundman suggested a preliminary stage of condensing or shortening the data into a smaller unit whilst maintaining the full meaning of the original information. However, the majority of the text analysed was already in a concise form and therefore this stage was deemed unnecessary.

B.8. Phase Two: Quantitative Methodology - Main Study

B.8.1. Recruitment/Procedure

The researcher followed the procedure (B.6.1.) and used the same inclusion and exclusion criteria (B.5.4., to B.5.5) described above for the pilot study to recruit interested participants (steroid-users) via advertisements across various online social media platforms (e.g., bodybuilding forums, Facebook, email). Notably, the researcher only recruited from five bodybuilding forums: (1) <http://www.uk-muscle.co.uk>, (2) <http://www.musclelounge.co.uk>, (3) <http://www.tmuscle.co.uk>, (4) <https://thinksteroids.com>, and (5) <http://www.muscletalk.co.uk>, who also advertised the study on their website (see Appendix I for recruitment messages). The researcher also reposted on the forums and on Facebook to enhance recruitment on multiple occasions. All participants were redirected to the Survey Gizmo website and followed the same procedure above to complete the TPB questionnaire (see Appendix J for the TPB questionnaire and Appendix K for participants information sheet). Recruitment occurred from 3rd May to August 16th 2014.

Additionally, the researcher contacted a research manager at Addaction to recruit from their main site in Lincoln. A paper version of the TPB questionnaire was created and administered to interested participants at Addaction by the locality manager. The locality manager provided service-users with information regarding the study during their needle exchange or registration and invited them to participate in the study. If they accepted, they were given a prepaid envelope addressed to the first author containing a participant information sheet, a copy of the TPB questionnaire and a debrief form. Notably, completion of the questionnaire was an indication of the participants implied

consent. Participants could either complete the questionnaire and leave it with the locality manager or post it back to the first author. Recruitment occurred from 23rd July to August 16th 2014. Finally, as a contingency recruitment site, the chief investigator made initial links with the Health Shop (NHS needle exchange service) in Nottingham where they received service support for the study (see Appendix L). However, recruitment was not pursued at this site as recruitment from other sources was sufficient and timely.

B.8.2. Recruitment of Non-steroid-users and Procedure

The first author also recruited (from July 8th 2014 to the 10th October 2014) additional participants who were non-steroid-users after receiving ethical approval from the University of Lincoln. This was the only stipulation that differed from the previous inclusion criteria as stated above. Some participants were recruited via an advertisement on the Facebook page of the chief investigator, and some were recruited by direct email contact. Additionally, the chief investigator's friends and family also shared the link on their own Facebook pages. Interested participants selected the hyperlink and were subsequently directed to Survey Gizmo where they followed the same online procedures as above. The wording of the information sheet (see Appendix M), as well as certain questions within the questionnaire (see Appendix N), was slightly adapted to make it more applicable to non-users. For example, six questions from the demographic section were removed, which explored preference of steroid(s), including administration and information regarding cycles of use. One notable filter question was added to ascertain whether participants had previously used steroids. Five questions within the questionnaire were slightly modified, for example, "*My friends would____(disapprove-approve) of my steroid use*" become "*My friends would____(disapprove-approve) if I used steroids*". Five participants whom the chief investigator contacted to provide feedback about the questionnaire reported that they were generally happy with the overall construction and its length.

B.8.3. Sample Size and Justification

As discussed in the Journal Paper.

B.8.4. Participants

Steroid-users: 203 participants accessed the questionnaire from the various social media platforms. 85 participants (41.9%) completed the questionnaire with five people (2.5%) partially completing the questionnaire and this data was excluded from the analysis.

Non-steroid-users: 99 participants accessed the questionnaire either via a link originating from the chief investigator's Facebook page, or from the shared link via their friends and family on their own Facebook pages. 75 participants (75.8%) completed the questionnaire. Therefore, 160 participants engaged in this research.

Extended Results Chapter

C.1. Overview

This section will outline two individual phases. An outline of the first phase will involve presenting the extended participants' demographic information; a discussion about the development of the direct (attitudes, subjective norms and PBC), and indirect TPB measures (behavioural, normative and control beliefs), including behavioural intention; the process of establishing inter-rater reliability; the creation and piloting of the draft TPB questionnaire; and the results for research questions 1 and 2. For phase two, this section will include the multiple regression analysis, the logistic regression analysis and the independent sample *t*-tests analysis with their respective assumptions being checked. Finally, participants' extended demographics will be provided before focusing on the results for research questions 1 and 3 as research question 2 has already been addressed.

C.1.1. Phase One - Extended Demographic Information⁴⁵

Table 12

Demographic characteristics for phase one n = 28

Characteristic	N	%
Age	-	-
Age ranged from 18 to 55, <i>M</i> = 34		
Ethnicity		
White British	13	46.4%
White	8	28.6%
White Irish	2	7.1%
Indian	2	7.1%
Other	3	10.8%
Current employment status		
Employed for wages	22	78.6%
Self-employed	4	14.3%
A student	2	7.1%
Marital status		
Married, in a civil partnership or domestic partnership	15	53.6%
Single, never married	11	39.3%
Other	2	7.2%

⁴⁵ See Appendix O for additional participant demographic information, including steroid-usage characteristics, gym use and lifestyle characteristics.

C.2. Phase One - Qualitative Analysis

C.2.1. TPB Questionnaire Item Development

All questionnaires from the 28 participants were exported from Survey Gizmo into a Microsoft Excel spreadsheet. This information was read multiple times allowing the chief investigator to become familiarised with the content before consulting with research supervisors (NGM and RdN) during the development of the questions.

C.2.2. Development of the Direct Measures (Attitudes, Subjective Norms and PBC) and Behavioural Intention

Firstly, the direct measures included below are template questions that are not directly informed by the elicitation study, but generic items for gauging TPB constructs. Secondly, the information below regarding the questions expands on and should be used in conjunction with the TPB questionnaire as presented in the Journal Paper (materials section).

C.2.3. Attitude

The TPB manual recommended the use of four questions, which followed a single 'stem' that defined the behaviour under examination. The questions included instrumental items that related to whether the behaviour achieves something (e.g., '*The wrong thing to do-The right thing to do*') and experiential items relating to how it feels to carry out the behaviour (e.g., '*Enjoyable-Unenjoyable*'). Items were arranged in the questionnaire to include a mix of positive and negative endpoints to help reduce the risk of participants developing a 'response set' – i.e., propensity to respond in the same manner irrespective of the content.

C.2.4. Subjective Norms

Recommendations to include three items within the questionnaire were followed and participants were required to complete an otherwise incomplete sentence. Items were also arranged in a way to include a mixture of positive and negative endpoints as outlined in the Journal Paper.

C.2.5. PBC

Four items were included in the questionnaire based on the recommendations, and items were arranged so that the ends of the scales contained a mix of positive and negative endpoints as presented in the Journal Paper.

C.3. Development of the Indirect Measures (Behavioural Beliefs, Normative Beliefs and Control Beliefs)

C.3.1. Content Analysis

The data elicited by the fixed nine open-ended questions were separated into the corresponding TPB constructs (attitudes, subjective norms, and PBC) for their respective content analyses to develop the individual belief-based items. For each of the TPB constructs, similarities in participants' data were identified to create codes. Abstracted codes were thereafter compared for similarities and differences, allowing them to be grouped into sub-categories and/or categories. Finally, understanding of the underlying meaning of the data was developed via interpretation of the manifest content by the chief investigator – resulting in the development of over-arching themes and coding tables (Slack & Parent, 2006).

The chief investigator and his research supervisor (NGM) individually developed coding frames for each of the nine open-ended questions. They independently coded content (item responses) in terms of overarching TPB constructs (behavioural, normative, and control beliefs) and identified discrete categories of content under each of these. In this way they worked deductively within their a priori-selected TPB framework to identify behaviour-specific categories of content (i.e., grouping and sub-grouping steroid-use content in terms of behavioural, normative, and control beliefs).

An alternative content analysis of the more exploratory (11 non-TPB) questions identified additional content that mapped onto aspects of the TPB

model (i.e., beliefs underpinning steroid-use attitudes, subjective norms, and PBC). Where relevant to the TPB framework, this additional content was coded and merged with content identified from the nine TPB-specific questions (described above). Subsequently, merged TPB-related content was used to inform development of the draft TPB questionnaire. Additional non-TPB factors emerged which did not map onto any of the TPB coding tables as presented below in Table 14 (see Appendix P for an example of a coding table for the development of behavioural beliefs [advantages of steroid-use]).

C.3.2. Establishing Inter-Rater Reliability

To reduce the effects of researcher bias, and to increase validity of results when conducting the content analysis, the creation of sub-categories, categories and themes was discussed and reflected upon between the chief investigator, and research supervisors and revised accordingly. Additionally, for each of the three main organising themes (TPB constructs), having agreed on the coding framework and sub-categories within each theme, 20% of content (selected at random) was independently categorised by a research supervisor (NGM). See Appendix Q for an example of categorisation.

Joffe (2011) argues that it is important to conduct a structured assessment to determine the reliability of an individual's coding and categorisation. Normally, this is achieved by two independent researchers coding the data independently before comparing their codes and establishing the extent of agreement between them. Inter-rater reliability was therefore performed by conducting a Cohen's Kappa coefficient within a Microsoft Excel spreadsheet to determine the percentage of agreement between the chief investigator and their research supervisor (NGM) (Cohen, 1988). A Kappa of > .80 represents a very good level of agreement and indicates reliable coding (Yardley, 2008). The inter-rater reliability scores indicated perfect agreement for behavioural beliefs ($K=1$), normative beliefs ($K=1$) and control beliefs ($K=1$). The chief investigator and his research supervisor (NGM) discussed and agreed upon the broad framework prior to the coding, and this doubtless increased reliability of subsequent coding and classification. However, testing the reliability of coded content was important to demonstrate that the agreed framework

could support reliable coding and classification. Therefore, high reliability here suggests that the agreed framework was clear with discrete, coherent categories, supporting an internally replicable analysis of content designed to give the chief investigator and NGM confidence that the coding would be transparent to others as well as externally replicable (see Appendix R for an example of the Kappa test for behavioural beliefs [disadvantages of using steroids]).

C.3.3. Behavioural Beliefs (Advantages and Disadvantages of Using Steroids)

The 25 behavioural beliefs identified that were most often listed fell into 11 board categories and were converted into a set of statements by the chief investigator and his research supervisors (NGM and RdN). These statements should have captured the strength of the beliefs affecting the behaviour of the steroid-using population. The themes (behavioural beliefs) extracted were listed in order of frequency, ranging from the most often mentioned to the least often mentioned. The statements, 11 in total, included approximately 75% of all of the beliefs captured, thus providing adequate coverage of the steroid-users' beliefs (Francis et al., 2004). The belief statements were then converted into an incomplete sentence with either a positive or negative response evaluation of the belief statement. A further 11 items and incomplete statements were designed to assess outcome evaluations for each of the behavioural beliefs.

C.3.4. Normative Beliefs (Individuals Who Would Approve/Disapprove of Steroid-use)

Similarly, the process described above converted the most often listed normative beliefs, nine in total, and developed a list of eight categories that were converted into statements to assess the strength of normative beliefs. Influential forms of social pressure were then converted into eight statements about the importance of each type of pressure upon participants and examined the strength of motivation to comply with the reference group or individual.

C.3.5. Control Beliefs (Factors or Circumstances that Enable/Prevent Steroid-use)

Finally, the eight identified categories and the most frequently mentioned control beliefs developed a list of five statements to assess the strength of control beliefs and were further converted into five incomplete statements to assess an individual's perceived power to influence their steroid-use.

C.4. Creating and Piloting the Draft TPB Questionnaire Development

Although section one (demographics) of the draft TPB questionnaire also contained 22 questions, some of the questions were removed, others were modified and some new questions were added after reviewing the feedback comments for each item. For example, questions exploring participants' steroid-use (e.g., amount consumed on a typical course, including heaviest use) were removed as it was difficult to analyse due to the variability of each participant's unique cycle. Other adaptations included reducing identified over-specificity and burdensomeness of response options for some items (e.g., educational attainment categories were reduced from eight to four), and increasing the amount of available options and categories to select from (e.g., more choice of steroid categories). Finally, one new item explored the participant's beliefs about the five most important side-effects of steroids.

During the last stages of phase one, five of the original 28 participants were asked to review the draft TPB questionnaire. They were encouraged to comment on the items by completing free-text responses. For example, "*Are any items ambiguous or difficult to answer?*" and "*Does it feel too long?*". The chief investigator and his research supervisors (NGM and RdN) reviewed the respondent feedback and made minor changes to the draft TPB questionnaire. For example, one respondent reported that there was some repetition towards the end of the questionnaire. This related to the generalised intention items that were consequently separated and distributed throughout the questionnaire. Another respondent noticed some typos in a statement, and some of the wording had to be changed prior to creating the final TPB questionnaire (see Appendix I).

C.5. Phase One - Qualitative Results

C.5.1. Research Question 1. *Can explanations of steroid-use be accounted for in terms of the TPB framework?*

C.5.2. Behavioural Beliefs

Inspection of the categories developed from the pilot questionnaire shows that participants identified both advantages and disadvantages of steroid-use. Although the three most popularly endorsed beliefs pertained to perceived 'negative' (i.e., causing visible/physical, internal and psychological) side-effects of steroid-use, the combined advantages outweigh them (i.e., participants identified and endorsed more advantages than disadvantages overall) (see Table 13).

C.5.3. Normative Beliefs

Interestingly, the vast majority of participants experienced substantial pressures from others opposing the use of steroids. Most other people (i.e., non-users and wider society) were identified as being the most prevalent group against steroid-use, followed by the family. Conversely, other bodybuilders and gym-users were perceived as being more approving of steroid-use (see Table 13).

C.5.4. Control Beliefs

Examination of factors identified as moderators of perceived ability to use steroids (controllability), legalisation and access to a reliable supplier were the most commonly identified (see Table 13).

Table 13

Summary of the categories of individual belief-based measures developed for the questionnaire

Component	Categories	N	
Behavioural beliefs	Build up muscles more quickly		15
	Enhance recovery time (e.g., reduce injury)		12
	Increase strength		11
	Enhance potential/ training ability (e.g., push beyond plateau)		11
	Improve physical appearance		10
	Mood will improve		9
	Improve competitive performance		7
	Cause visible/physical side-effects (e.g., testicles shrinking, skin problems)		23
	Cause internal side-effects (e.g., organ damage, risk of infection)		18
	Mood will be negatively affected (e.g., increased anger, mood swings)		17
	Become dependent on them		8
Normative beliefs		Approving vs. Disapproving	
		N	N
	Most other people (e.g., non-users and wider society)	0	17
	Family	5	16
	Other bodybuilders/gym-users	12	0
	Medics	3	6
	Friends	5	3
	Partner (e.g., girlfriend/boyfriend)	5	1
	Athletes and coaches	4	2
	Work colleagues/ employer	0	6
Control beliefs	Made legal		21
	Able to identify a reliable supplier		12
	Certain about the quality of being supplied		7
	Have enough money to buy them		7
	Accessible over the counter		6

N = frequency counts of codes endorsed within each category

C.6. Research Question 2. *How do steroid-users explain their use of steroids? (i.e., In particular, do they identify (novel) explanatory factors that are not accounted for by the TPB framework alone?).*

Non-TPB questions developed several individual categories that directly mapped onto the TPB framework and were included within the development of the TPB questionnaire. However, these questions still allowed for novel insights that could explain participant steroid-use outside of the TPB framework. Furthermore, additional insights concerning the acquired knowledge and experience of steroids are also presented in Table 14.

Table 14

Novel categories accounted for outside of the TPB framework, including additional insights into participants' experience of steroids

Component	Categories	N
Self-identified aetiological factors	Reduced natural testosterone levels	5
Self-identified maintaining factors	Protection	1
Information sources	Internet (e.g., online forums, journals/articles) *	14
	Friends	9
	At the gym	6
	Books	5
Body image self-evaluations (maintenance and escalation)	Satisfied /positive affect towards body	27
	Partially satisfied with body, though still a work in progress	17
	Unsatisfied/negative affect towards body	14
Social feedback / reactions from others to physical appearance since steroid-use	Curious about training/dieting	3
	Negative remarks	2
Lifestyle changes (or non-changes) associated with steroid-use	Unchanged	11
	Stopped drinking/smoking and using drugs	4

Note. * Due to large amount of data, only the most prevalent (highest frequency counts) sources are reported.

The vast majority of reasons participants started to use steroids and continue to use them adhere closely with the advantages of using steroids in the TPB. However, other rationales for steroid-use emerged such as a reduction in natural testosterone levels and for “protection” (i.e., to feel safe).

Participants reported that they learned about steroids from a variety of sources. The internet and online facilities (e.g., bodybuilding forums) were shown to be the most popular choices for conducting research due to ease of access to freely available information whilst maintaining anonymity. Additionally, participants sought information from others considered to have more knowledge than them (e.g., “other bodybuilders” and “friends”) and read books and journals.

Regarding participant’s body image and self-evaluations, responses fell into three main categories with the most prevalent category representing body satisfaction (“think I look good”, “good shape and like the way I look”) combined with having a positive affect towards their body (“feel better about it now”, “I feel great, confident mainly”). This was followed by participants reporting that they were partially satisfied with their body (“work in progress, I am still not fully satisfied”, “better than it was, but could still improve”). Finally, participants reported that they were unsatisfied and had a negative affect towards their body (“not big enough and holding too much weight”, “I feel like I haven’t reached my potential”).

Steroid-using participants reported that they received mainly positive remarks and comments about their physical appearance (e.g., “got bigger”, “healthier” and “stronger looking”) as well as being asked about their training and dieting habits, which validated and reinforced their exercise regime and steroid-use. Conversely, they also received the occasional negative comment, for example, when they stopped using steroids they were told that they “lost size” and “looked better before”.

The majority of participants reported an improved quality of life since they started using steroids, with their responses directly mapping onto the

advantages within the TPB. Interestingly, a novel category also emerged for some participants pertaining to improved health and lifestyle choices (e.g., “stopped using drugs”, “don’t drink or smoke anymore”). However, another category labelled “unchanged” developed as a result of reports that steroid-use did “not have much impact” on the lives of participants, and that they “have always kept fit”.

C.7. Phase Two – Quantitative Analysis

C.7.1. Parametric and Nonparametric Testing

Parametric tests are statistical tests which require that their underlying assumptions have been met in order to be conducted. Parametric tests are seen as more favourable than nonparametric statistics as they have greater statistical power, including the ability to detect statistically significant results (Reber, 1995). However, nonparametric tests also have advantages over parametric methods. For example, they make fewer assumptions about the samples being studied (i.e., they are used to test population parameters when the variable(s) are not normally distributed). Their results may be as exact as parametric procedures and they may be the only test appropriate to analyse the data (Whitley & Ball, 2002).

C.7.2. Preliminary Analysis

The original dataset used for the preliminary analysis was exported from Survey Gismo and converted into an Excel spread sheet before it was converted into an SPSS dataset. This new data set was proofread against the original file. SPSS FREQUENCIES was run for each variable. Missing data fields were checked, and there was no missing data as participants were required and reminded (by a message on the screen) to complete all questions before proceeding onto the next page of the questionnaire. All of the responses were in the range represented by the response format, and the means and standard deviations appeared plausible.

C.8. Hierarchical Multiple Regression Analysis and Assumptions

Hierarchical multiple regression is an alternative form of the basic multiple linear regression that enables the researcher to dictate a fixed order of entry of predictor (independent) variables in order to control for the effects of covariates (i.e., independent of the influence of other predictor variables) on the dependent variable (Statistic Solutions, 2014). In hierarchical multiple regression, the predictor variables can be entered one at a time or in blocks. Usually, this entry is based on the researcher's logical or theoretical considerations (Tabachnick & Fidell, 2007). The analysis proceeds in steps, with a statistical test of the change being examined from the first step in order to evaluate the importance of the predictor variables entered during the second step (Tabachnick & Fidell, 2007). This model involved entering all the direct measures (variables) simultaneously into the model at the first step, and then entering all of the additional indirect measures (variables) for the second step. As with most types of regression models, the inclusion of predictor variables needs to be considered carefully. Field (2013) argues that only predictor variables that are significantly significant to the outcome (dependent) variable are to be included in a regression model. Since there were several predictor variables that did not have a significant relationship with the outcome variable, they were therefore excluded from the analysis.

C.8.1. Sample Size

Ten cases of data are recommended for each predictor in the model (Field, 2013). Therefore, as this study has three predictors, 30 cases are recommended. Conversely, based on the statistical power analysis, as discussed in the Journal Paper, for TPB studies which use a multiple regression model recommends a minimum of 80 cases. Therefore, the latter rule was adopted and this assumption was upheld.

C.8.2. Linear Relationship

The relationship between the independent and dependent variables needs to be linear. This linearity assumption was assessed post-hoc by reviewing the scatter plots regarding the linear relationship between the individual independent variables and the dependent variable. If linearity is

apparent then the values should be randomly distributed around zero. Scatter plots showing these relationships can be found in Appendix S. This indicted linearity. It is interesting to note, that although there appears to be a linear relationship between the dependent variable and the regression standardised predicted value, it also represents a ceiling effect and may be subject to bias⁴⁶. However, Tabachnick and Fidell (2007) argue that this may be a failure of normality, more so than a non-linear relationship. Nevertheless, a failure of linearity in regression does not invalidate an analysis, but, rather, weakens it.

C.8.3. Independent Errors

For any two observations the residual terms should be independent (i.e., uncorrelated). If this assumption is violated the confidence intervals and significance tests will be invalidated. The Durbin-Waston test was used to test this assumption; values of less than 1 or greater than 3 are considered problematic. However, the Durbin-Waston test indicated a value of 1.92 and therefore indicated that the residual terms were independent (Field, 2013).

C.8.4. Outliers and Residuals

Inspection of the scatter plots showed that there were no outliers. The residuals were also checked for evidence of bias. Casewise diagnostics were examined that revealed one case which may have been an outlier (value +/- 3.00). However, Cook's distance showed that this case did not have a value above 1 and therefore did not influence the model. Additionally, Mahalanobis distance was checked and no values exceeded the critical value for 3 IVs (16.27); therefore the case did not need to be removed (Field, 2013).

C.8.5. Normally Distributed Data

In research a normal distribution is the “theoretically expected probability distribution when...samples are drawn from an infinite population in which all events are equally likely to occur” (Reber, 1995, p. 221). There are a number of

⁴⁶ Tobit modelling produced similar substantive findings (as compared with linear model) – i.e., when the three explanatory TPB variables were entered together, attitude was the only variable to retain an independently significant relationship with intention. Tobit modelling indicated that observed unstandardized coefficients may be an underestimate (if applied to broader population) – although the general pattern of results (e.g., relative contribution of explanatory TPB variables) is upheld and remains the same.

methods to assess normality. Within this study normality was assessed in three ways: (1) histograms, (2) Kolmogorov-Smirnov Test and (3) Z-scores.

Histograms were assessed visually for a symmetrical, bell-shaped curve, with the greatest frequency of scores found in the middle and tapering out at the ends (Gravetter & Wallnau, 2004). Histograms for each predictor and dependent variables are located in Appendix T. Reviewing the histograms revealed some variables that were not normally distributed.

C.8.6. Kolmogorov-Smirnov Test

As discussed in Field (2013), assessing histograms alone is an insufficient and subjective process. Therefore, it was deemed necessary to conduct a Kolmogorov-Smirnov test. The results indicated that only behavioural beliefs and normative beliefs were not significant. This indicates that all of the other variables were significant and represent a deviation from normality. However, Field (2013) suggests that when dealing with larger samples (i.e., over 100) Kolmogorov-Smirnov tests are likely to produce significant results even if variables are normally distributed. Although this present sample size was 85, and not considered to be a larger sample size, normality was also assessed using Z-scores.

C.8.7. Z-scores for Normality

Skewness and kurtosis scores were converted into z-scores by subtracting the mean of the distribution followed by dividing by the standard deviation of the distribution (standard error can be used for this case) (Field, 2013). This method was conducted for each predictor (independent) variable and the outcome (dependent) variables and the results are presented in Appendix U. Z-scores above or below 1.96 are significant at $p < 0.05$ (Field, 2013). The results indicate that the majority of variables (four-out-of-five) are not normally distributed.

C.8.8. Heteroscedasticity

Field (2013) suggests that at each level of the predictor variable(s), the variance of the residual terms should be constant and therefore have the same variance (homoscedasticity). However, when the variances are unequal this is known as heteroscedasticity, and violating this assumption invalidates the confidence intervals and significance tests. This assumption was also checked by reviewing the scatter plots. Although there might be slight heteroscedasticity for certain variables, Berry and Feldman (1985) and Tabachnick and Fidell (2007) argue that slight heteroscedasticity has little effect on significance tests.

C.8.9. Multicollinearity

As more than one predictor is included in this model, multicollinearity may occur when the independent variables are not independent from one another. This means that it is impossible to collect different estimates of the regression coefficients, as there is an absolute amount of combinations of coefficients that work equally well. This leads to the *b*-values becoming less trustworthy and also limits the size of *R* (i.e., measurement of the correlation between the predicted values of the outcome and the observed values) (Field, 2013). Several methods are used to identify multicollinearity, including: (1) reviewing the correlation matrix and (2) reviewing the collinearity diagnostics (e.g., variance inflation factor VIF and tolerance) (Field, 2013). Predictors that correlate too highly with one another, $> .9$, are cause for concern and ideally the correlation coefficients need to be smaller than $.08$. (Statistic Solutions, 2014). The VIF indicates whether or not a predictor has a strong linear relationship with other predictors and values greater than 10 indicate that the regression might be bias (Bowerman & O'Connell, 1990). Similarly, tolerance below 0.1 indicates a serious problem (Menard, 1995). Inspection of the collinearity statistics indicated that the VIF values for all the predictor variables were just over 1, while the lowest tolerance was $.781$ as presented in Appendix V and therefore did not violate the assumption of multicollinearity.

C.8.10. Conclusions

As the assumption for normality was violated, including a slight heteroscedasticity with some variables, it was deemed as necessary to use a robust regression, which involves bootstrapping (Efron & Tibshirani, 1993) (See Figure 7 below). Non-normality prevents the researcher from knowing the shape of the sampling distribution unless a large sample is available (Field, 2013). However, Haukoos and Lewis (2005) suggest that bootstrapping solves this problem as it uses resampling with replacement to estimate the statistic's sampling distribution. This may be subsequently used to estimate confidence intervals and standard errors for that particular statistic. For example, resampling with replacement creates a number of resampled data sets (known as bootstrap samples) that possess the same amount of data as the original data set. Performing resampling with replacement involves a data point being randomly chosen from the original data set and copied into the resampled data set being created. Even though the data point has been used, it is replaced and another data point is randomly chosen and repeated until a resampled data set with a desired size is created (Haukoos & Lewis, 2005). The end result usually provides a resampled data set of 1000 (set by default by SPSS). A confidence interval for the statistic is calculated from the collection of values obtained for the statistic (Haukoos & Lewis, 2005). Although there are multiple options for computing the confidence intervals (e.g., the percentile method, the normal approximation method), Field (2013) endorses the use of the bias-corrected and accelerated (BC_a) method as it is more accurate than other methods (e.g., it adjusts for bias in the bootstrapped sampling distributions relative to the actual sampling distributing) (see Haukoos & Lewis, 2005).

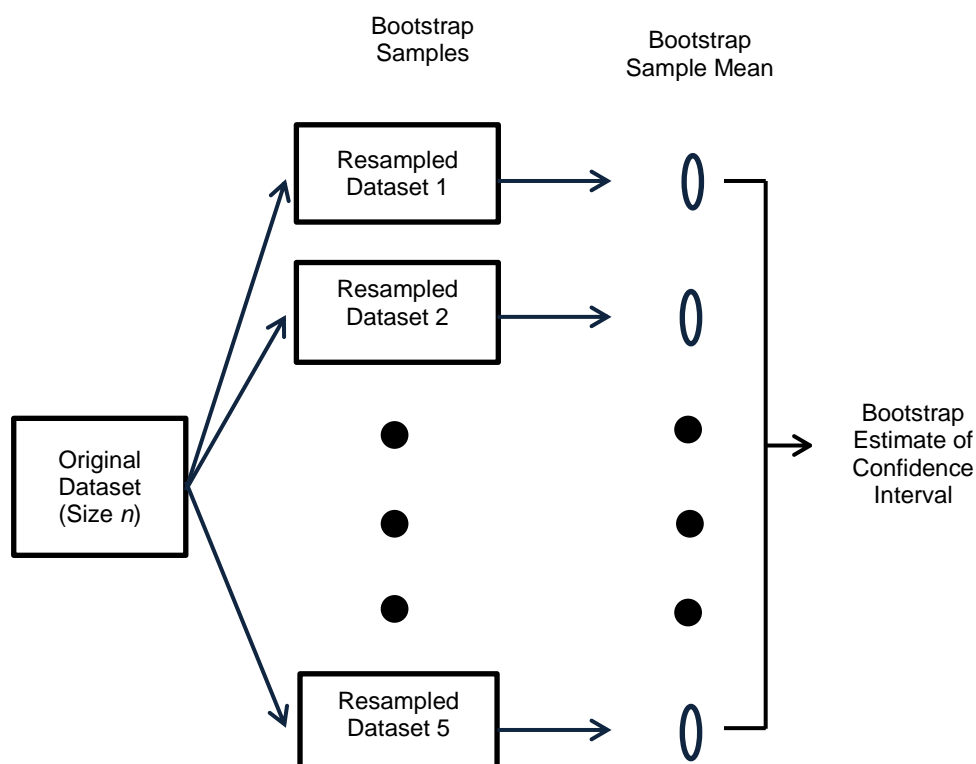


Figure 7. Schematic depiction of the steps in the bootstrap

C.9. Analysis of the Correlation between the Direct and Indirect Measures of the TPB

The direct measure of attitude was significantly correlated with behavioural beliefs, $r = .340$ [.131, .518] $p < .001$, which indicates that the indirect measure was well constructed and reflected the measured construct. Similarly, the direct measure of subjective norm was significantly correlated with normative beliefs, $r = .247$ [.067, .410] $p < .01$, and was considered well-constructed. However, the indirect measure of PBC was not significantly correlated with control beliefs, $r = .099$ [-.155, .337] $p > .05$, which indicates that the indirect measure may have lacked sensitivity within this sample (steroid-users) and/or did not adequately reflect the range of the measured construct.

C.9.1. Reliability and Internal Consistency – TPB Direct Measures

Reliability is indicated by the accuracy and stability of a measuring instrument (Kerlinger & Lee, 2000). The most widely used measure of reliability (internal consistency) is Cronbach's alpha to determine how closely related a set of items are as a group (Cronbach, 1951). A "high" alpha-score does not necessarily indicate that the measure is unidimensional as there can be two or

more independent dimensions that are measured (Cortina, 1993). An internal consistency analysis of behavioural intention was used, and indicated that it had adequate reliability ($\alpha = .87$). Similarly, the analysis of the direct TPB measures indicated that attitude ($\alpha = .81$) had adequate reliability. However, subjective norms ($\alpha = .06$) and PBC ($\alpha = .17$) were much less consistent and represented that the variables did not cluster well together. Inspection of the SPSS Output for subjective norms revealed that there was a significant negative moderate correlation between two items, implying that there were two separate pressures involved. Technically these items should not be added together or combined in a different way since they are separate entities. Usually, a higher Cronbach's alpha indicates a more reliable test (Kline, 1999), however, the removal of an item to improve the Cronbach's alpha (from $\alpha = .06$ to $\alpha = .20$) within the subjective norm scale did not make a difference and also reduced the significance of the predictor variable. Nevertheless, the subjective norm construct was not included in the final analysis.

Similarly for the PBC construct, it had a Cronbach's alpha of $\alpha = .17$, indicating a poor internal consistency. Inspection of the findings reveals that items were not measuring the same thing and that they are multifactorial. For example, the participants' confidence regarding ability to use steroids was investigated with four items. Two items measured self-efficacy and produced statistically significant correlations with intention, whereas the other two items, measuring controllability, were not significantly correlated with intention. Although deleting the controllability items slightly increased the Cronbach's alpha (from $\alpha = .17$ to $\alpha = .28$), this process significantly reduced the model's predictive ability of behavioural intention. Furthermore, Ajzen (2006) argues that self-efficacy and controllability should remain in the model because of their commonalities. Therefore, it was decided to leave the items in for the final analysis.

C.9.2. Reliability and Internal Consistency – TPB Indirect Measures

It is deemed as inappropriate to assess the reliability (internal consistency) of the TPB indirect measures, as individuals can logically possess both positive and negative beliefs about the same behaviour (Francis et al.,

2004). For example, an individual might not be at all motivated to comply with the expectations of his parents, but might be highly motivated to comply with the expectations of his GP. Therefore, it was not logical to remove certain beliefs from the overall measures based on the rationale of having a low or negative correlation between the items. Nevertheless, it is still recommended to use test-retest reliability instead (Francis et al., 2004).

Kline (1999) suggests that a measure is reported to be valid if it measures what it asserts to measure. Furthermore, Cook and Campbell (1979) suggest that external validity indicates the degree to which findings can be generalised from the target population to a larger population. Ajzen (1991) proposes that the importance of the TPB variables may vary between populations and circumstances, therefore, the replication of the findings in other target populations may be advantageous in the pursuit of validating these findings.

C.10. Logistic Regression Analysis and Assumptions

As the dependent variable in research question 2 was binary rather than quantitative (e.g., participants were either steroid-users or non-steroid-users), Statistic Solutions (2014) recommend that the best way to predict the participant's behaviour is by using a logistical regression analysis. A fundamental notion in logistic regression is *odds ratio*, which is a parameter that identifies how many times smaller or larger the odds are when the independent variables increase by one unit. For example, an odds-ratio equal to 1 indicates that the odds remain the same due to an increase in the independent variable (i.e., indicating no relationship). An odds-ratio smaller than 1, indicates that the odds decrease due to an increase in the independent variable. Finally, an odds-ratio greater than 1, indicates that the odds increase due to an increase in the independent variable, and therefore represents a positive relationship. Logistic regression, which is similar to other linear models, is also open to some of the biases as discussed above. However, logistic regression is less restrictive and does not require as many of the important assumptions which other linear models are based on, such as ordinary least squares algorithms, linearity,

normality, homoscedasticity and measurement level (see Statistic Solutions, 2014). Nevertheless, other major assumptions still apply.

C.10.1. Outcome (Dependent) Variable

In logistic regression the outcome variable is dichotomous (binary) in nature (e.g., presence of the desired outcome versus absence of the desired outcome), and will therefore need to be coded correctly (Field, 2013). For example, steroid-users were coded as 1 and non-steroid-users were coded as 0, and this assumption was upheld.

C.10.2. Independence of Error Terms

Logistic regression assumes that each observation (data-point) is independent and not taken from a dependent sample. Therefore, this assumption was assumed.

C.10.3. Sample Size

As discussed in the Journal Paper.

C.10.4. Residuals and Outliers

Influential cases were checked by reviewing Cook's distance, and it was found that no cases had a value above 1. Furthermore, the standardised residuals were checked for outliers by reviewing the residual statistics in the SPSS data file, which revealed that no cases had a value below -3.29 or greater than 3.29 (Field, 2013).

C.10.5. Linearity

Although logistic regression does not assume linearity between the independent and dependent variables, it requires linearity of the independent variables and log odds as the test will underestimate the strength of the relationship and may reject the relationship too readily (Statistic Solutions, 2014). This assumption was tested by reviewing the interaction term between the predictor and its log transformation (Hosmer & Lemeshow, 1989). An interaction term that is significant indicates a violation of the assumption of the

linearity of the logit. Notably, all interaction terms have values greater than 0.5 (e.g., .999) and this assumption therefore is upheld (Field, 2013).

C.10.6. Multicollinearity

Tabachnick and Fidell (2012) argue that as long the correlation coefficients (assessed by reviewing the correlation matrix) among the predictors are less than 0.90 the assumption is met (as presented in the Journal Paper). This was further examined by reviewing the VIF (less than 10) and Tolerance values (greater than 0.1), which are presented in the collinearity statistics tables⁴⁷ (see Appendix W). Therefore, this assumption has been upheld.

C.10.7. Bootstrapping

Since a forced entry method was used for the logistic regressions (i.e., entering all of the predictor variables into the model simultaneously), meant that the same bootstrap option as above was selected (Field, 2013).

C.10.8. Reliability and Internal Consistency – TPB Direct Measures

An internal consistency analysis of the direct TPB measures indicated that attitude ($\alpha = .97$) and PBC ($\alpha = .62$) had adequate reliability, however, subjective norms ($\alpha = .43$) demonstrated far less consistency. Inspection of the SPSS Output indicated that the removal of any items within the individual constructs would not sufficiently improve the Cronbach's alpha of any of the scales. Since all of the TPB predictor variables had a statistically significant correlation with behavioural intention, they were all included in the final analysis.

C.11. Independent Sample *t*-test Analysis and Assumptions

Independent Sample *t*-tests investigate the difference between two unrelated groups in regard to the same continuous dependent variables. Independent Sample *t*-tests also need to pass six major assumptions: (1) the dependent variable needs to be measured on a continuous scale, (2) the independent variable should consist of two categorical and independent groups

⁴⁷ SPSS does not have an option for producing collinearity diagnostics in logistic regression, therefore it was run as a linear regression to obtain the VIF and Tolerance statistics.

(e.g., steroid-users and non-steroid-users), (3) there should be independence of observations (i.e., no relationship between the observations between the groups), (4) there should be no significant outliers, (5) the dependent variable should be relatively normally distributed for each group of independent variables, and (6) there needs to be homogeneity of variances (Laerd Statistics, 2013). Notably, assumptions five and six were violated and therefore it was deemed necessary to also use a bootstrap option

C.11.1. Bonferroni Corrections

Zaykin, Zhivotovsky, Westfall and Weir (2002) suggest that difficulties arise when undertaking multiple comparisons since this increases the probability of achieving a significant result by chance (e.g., a Type I error). Bonferroni corrections are a widely used statistic that accommodate for this by reducing the significance level (α -level). For example, the Bonferroni adjustment requires the alpha level to be divided by the number of comparisons being conducted. This process produces a new alpha level that comparisons need to be less than in order to obtain a statistically significant result (Nagakawa, 2004). However, some researchers (Moran, 2003) argue that the Bonferroni corrections may cause problems and may provide excessively conservative results (Foster & Stine, 2008). Nagakawa (2004) asserts that the Bonferroni procedure may cause a reduction in statistical power as it may reject an incorrect null hypothesis and subsequently result in an excessively high probability of making a Type II error. Whilst contemplating these arguments, for the purpose of this study and research question 3, it was important to have confidence in reporting statistically significant results when comparing the individual belief based measures of steroid-users with those of non-steroid-users. This meant that the Bonferroni procedure was adopted.

C.12. Phase Two - Quantitative Results

C.12.1. Participants Extended Demographics⁴⁸

Table 15

Demographic characteristics n = 160, 85 Steroid-users (SU), and 75 Non-steroid-users (NSU)

Characteristic	Com N	%	SU N	%	NSU N	%
Age						
18-25	35	21.9%	24	28.2%	11	14.7%
26-33	66	41.3%	31	36.5%	35	46.7%
34-41	33	20.6%	15	17.6%	18	24%
42-49	14	8.8%	8	9.4%	6	8%
50-57	11	6.9%	7	8.2%	4	5.3%
	Range 18 to 55, <i>M</i> = 32		Range 18 to 55, <i>M</i> = 32		Range 19 to 59, <i>M</i> = 33	
Ethnicity						
White British	104	65%	48	56.5%	56	74.7%
White	31	19.4%	25	29.4%	6	8%
Other White	6	3.8%	5	5.9%	1	1.3%
Other	19	11.8%	7	8.2%	12	16%
Current employment status						
Employed for wages	106	66.3%	55	64.7%	51	68%
Self-employed	30	18.8%	16	18.8%	14	18.7%
A student	15	9.4%	8	9.4%	7	9.3%
Other	9	5.6%	6	7.1%	3	4%
Marital status						
Single, never married	78	48.8%	41	48.2%	37	49.3%
Married, in a civil partnership or domestic partnership	75	46.9%	39	45.9%	36	48%
Other	7	4.4%	5	5.9%	2	2.6%

⁴⁸ See Appendix X for additional participant demographic information, including side-effects associated with steroid-use, gym use and lifestyle characteristics and additional steroid-usage characteristics.

C.12.2. Research Question 3. *How do steroid-users and non-steroid-users differ in their underlying beliefs with respect to steroid-use?*

C.12.3. Analysis of the Beliefs Corresponding with Steroid-use

The variation between steroid-users' and non-steroid-users' underlying beliefs about steroid-use were examined by exploring their responses to the questionnaire. Independent sample *t*-tests (bootstrapped) were utilised and the findings, representing each set of beliefs⁴⁹, are summarised in the tables below.

C.12.4. Behavioural Beliefs

In this analysis, ten of the underlying behavioural beliefs towards steroid-use were significantly different between the two groups in favour of steroid-users. These were *“enhance recovery time”*, *“increase strength”*, *“improve physical appearance”*, *“enhance potential and training ability”*, *“mood will improve”*, and *“improve competitive performance”*. There were significant differences in the opposite direction for the beliefs that “mood will be negatively affected” and that users will “become dependent on them” (i.e., non-users reported relatively greater endorsement of these beliefs). Overall, the largest differences between users and non-users (in terms of standardised effect sizes) were in their beliefs about the mood effects of steroid-use (“mood will improve” and “mood will be negatively affected”). Nevertheless, both groups reported that steroid-use *“cause internal side-effects”* and *“cause visible/physical side-effects”*, which was scored higher for non-steroid-users. Although not significantly different, *“build up muscles more quickly”* was one of the highest scores for both groups. There were also significant differences between the groups for seven of the beliefs for outcome evaluations (i.e., favourable or unfavourable judgements about different implications of steroid-use) with the exceptions of *“increase strength”*, *“enhance potential and training ability”*, *“mood will improve”* and *“improve competitive performance”*. Furthermore, these outcome evaluations also appeared to follow a similar trend as that described above for behavioural beliefs with the exception of *“Mood will be negatively*

⁴⁹ As multiple independent *t*-tests were conducted for each of the TPB beliefs, Bonferroni corrections were calculated for the alpha criterion for significance. For example: behavioural beliefs (22 items) p-value was adjusted to (.05/22) .0023; normative beliefs (16 items) p-value was adjusted to (.05/16) .0031 and control beliefs (10 items) p-value was adjusted to (.05/10) .005.

affected”, and *“become dependent on them”*, as steroid-users evaluated these beliefs as being unfavourable consequences (see Table 16).

C.12.5. Normative Beliefs

The two groups demonstrated significant differences concerning seven of the normative beliefs with the exception of *“most other people and non-users”*. Several of the referents, including *“family”* (being the most powerful influence), *“medics”*, *“friends”*, and *“work colleagues and employer”*, including the non-significant *“most other people and non-users”* item, were reported to be against steroid-use in both groups. Additionally, *“partner”* and *“athletes and coaches”* were against steroid-use for non-steroid-users, however, these referents were slightly supportive for steroid-users, and both groups endorsed the view that *“other bodybuilders and gym-users”* would be in favour of steroid-use. Notably, in both groups, the influence of a partner was highly weighted (greatest ratings of motivation to comply). Given this, the finding that steroid-users typically believed their partner to hold neutral (tending towards supportive) views of their steroid-use gains salience and a perception of their partner’s neutrality and support may help to maintain steroid-use behaviour. Seven ‘motivation to comply’ scores were significantly different between the two groups with the exception of *“other bodybuilders and gym-users”*. All of the scores for non-steroid-users were higher than steroid-users indicating a desire to comply with the opinions of these referents to not take steroids. The opinion of a partner was judged to be the most important referent in both groups, followed by the family. It is therefore apparent that participants wished to comply with these sources of pressure more than any other (see Table 17).

C.12.6. Control Beliefs

The two groups demonstrated significant difference concerning three out of five control beliefs, all of which were associated with a greater likelihood to use steroids. These factors were *“able to identify a reliable supplier”* (representing the biggest difference between the groups), *“have enough money”* and *“certain about the quality”*. Although not significantly different, both groups agreed that *“made legal”* and *“accessible over the counter”* would also make an individual more likely to use steroids, and overall steroid-users rated all of the

control beliefs more strongly than non-steroid-users. In terms of factors that may potentially enable or prevent steroid-use, only *“able to identify a reliable supplier”* was significant for both groups. Unsurprisingly, steroid-users indicated that they were more likely to be able to identify a reliable supplier, whereas non-steroid-users indicated that they would not, as evidenced by their negative score (see Table 18).

Table 16

Mean score for behavioural belief and outcome evaluation items: comparison of steroid-users (Users) and non-steroid-users (Non-users), (SD) and effect size

	Users	Non-users	Effect Size	Users	Non-users	Effect Size
	<u>Behavioural beliefs</u>			<u>Outcome evaluations</u>		
Build up muscles more Quickly	6.39 (1.06)	6.07 (0.91)	0.30	2.79 (0.44)	2.32* (0.66)	1.07
Enhance recovery time	6.05 (1.24)	4.52* (1.73)	1.23	2.28 (0.97)	1.65* (1.21)	0.65
Increase strength	6.38 (0.87)	5.52* (1.31)	0.99	2.11 (1.01)	1.64 (0.95)	0.46
Improve physical appearance	5.85 (1.37)	4.49* (1.72)	0.99	2.26 (0.88)	1.57* (1.14)	0.79
Enhance potential/ training ability	6.42 (0.88)	5.49* (1.31)	1.06	2.25 (1.06)	1.65 (1.06)	0.57
Mood will improve	4.53 (1.68)	1.67* (0.86)	1.70	1.58 (1.35)	1.35 (1.27)	0.17
Improve competitive Performance	6.04 (1.20)	5.12* (1.61)	0.77	1.74 (1.26)	1.23 (1.32)	0.41
Cause visible/physical side-effects	5.21 (1.61)	6.21* (1.20)	-0.62	-1.69 (1.31)	-2.83* (0.67)	0.87
Cause internal side-effects	3.74 (1.62)	6.12* (1.24)	-1.47	-2.44 (1.11)	-2.95* (0.46)	0.46
Mood will be negatively Affected	2.98 (1.54)	6.21* (1.20)	-2.09	-1.93 (1.27)	-2.85* (0.65)	0.72
Become dependent on them	2.62 (1.87)	5.43* (1.59)	-1.50	-2.01 (1.38)	-2.89* (0.61)	0.64

Note. Mean difference and BCa bootstrap 95% CIs reported in brackets. Behavioural beliefs (22 items) p-value was adjusted to (.05/22) .0023*. Cohen (1988; 1992) has proposed some widely used suggestions regarding what constitutes a small or large effect size: $d = 0.2$ (small), 0.5 (medium) and 0.8 (large). Bootstrap results are based on 1000 bootstrap samples. Behavioural beliefs scores ranged from 1 to 7, with higher scores indicating a perceived likelihood that using steroids will result in a particular outcome. Outcome evaluations scores ranged from -3 to 3, with higher scores indicating a positive evaluated outcome.

Table 17

Mean score for normative belief and motivation to comply items: comparison of steroid-users (Users) and non-steroid-users (Non-users), (SD) and effect size

	Users	Non-users	Effect Size	Users	Non-users	Effect Size
	<u>Normative beliefs</u>			<u>Motivation to comply</u>		
Most other people/ non-users	-2.08 (1.31)	-2.48 (0.70)	0.31	1.98 (1.55)	3.32* (1.99)	-0.86
Family	-1.45 (1.64)	-2.81* (0.49)	0.83	3.88 (1.84)	5.67* (1.41)	-0.97
Other bodybuilders/ gym-users	1.60 (1.25)	0.24* (1.63)	1.09	1.80 (1.34)	2.01 (1.29)	-0.16
Medics	-1.54 (1.59)	-2.47* (1.04)	0.58	2.69 (1.64)	4.84* (1.71)	-1.31
Friends	-0.25 (1.60)	-2.35* (0.99)	1.31	2.60 (1.65)	4.80* (1.60)	-1.33
Partner	0.11 (2.03)	-2.69* (0.74)	1.38	4.38 (1.85)	5.93* (1.18)	-0.84
Athletes and coaches	0.02 (1.57)	-2.16* (1.26)	1.39	2.44 (1.76)	4.11* (2.14)	-0.95
Work colleagues/ employer	-1.64 (1.39)	-2.29* (1.02)	0.47	2.05 (1.49)	4.29* (1.93)	-1.50

Note. Mean difference and BCa bootstrap 95% CIs reported in brackets. Bootstrap results are based on 1000 bootstrap samples. Normative beliefs (16 items) p-value was adjusted to (.05/16) .0031*. Cohen (1988; 1992) has proposed some widely used suggestions regarding what constitutes a small or large effect size: $d = 0.2$ (small), 0.5 (medium) and 0.8 (large). Normative beliefs scores ranged from 1 to 7, with higher scores indicating perceived positive social pressures (i.e., significant others approve/think that they should use steroids). Motivation to comply scores ranged from -3 to 3, with higher scores indicating a general motivation to comply with these significant others.

Table 18

Mean score for control belief and power items: comparison of steroid-users (Users) and non-steroid-users (Non-users), (SD) and effect size

	Users	Non-users	Effect Size	Users	Non-users	Effect Size
	<u>Control beliefs</u>			<u>Power</u>		
Made legal	2.60 (1.92)	2.07 (1.33)	0.28	1.86 (1.36)	1.67 (1.31)	0.14
Accessible over the Counter	2.59 (1.98)	2.11 (1.35)	0.24	1.95 (1.36)	1.60 (1.26)	0.26
Able to identify a reliable Supplier	5.38 (1.66)	2.21* (1.51)	1.91	1.91 (1.30)	-0.24* (1.66)	1.65
Have enough money	6.00 (1.23)	4.39* (1.99)	1.31	-1.93 (1.63)	-2.00 (0.15)	0.04
Certain about the quality	4.19 (1.77)	1.61* (1.06)	1.46	-1.94 (1.30)	-2.28 (1.29)	0.26

Note. Mean difference and BCa bootstrap 95% CIs reported in brackets. Bootstrap results are based on 1000 bootstrap samples. Control beliefs (10 items) p-value was adjusted to (.05/10) .005*. Cohen (1988; 1992) has proposed some widely used suggestions regarding what constitutes a small or large effect size: $d = 0.2$ (small), 0.5 (medium) and 0.8 (large). Control beliefs scores ranged from 1 to 7, with higher scores indicating the belief of the likelihood of several factors that enable steroid-use. Perceived power to influence scores ranged from -3 to 3, with higher scores indicating the expected impact of these factors would make it more likely/much easier to use steroids.

Extended Discussion Chapter

D.1. Overview

This section includes a discussion of the research findings in relation to the research questions, and will be presented with regards to previous research and extant theory. Phase One (research questions 1 and 2) findings will be discussed in their entirety below. Phase Two research question 1 aims to extend the descriptions provided in the Journal Paper and research question 2 has already been addressed. Research question 3 will also be discussed in its entirety. This section will also outline the strengths and limitations of this study, as well as areas for future research and implications for clinical practice. Finally, it will provide a reflective account of the research process.

D.1.1. Phase One: Research Question 1.

The findings have indicated that participants' explanations of their steroid-use can be accounted for in terms of the TPB framework. For example, regarding participant's behavioural beliefs, it could be hypothesised that the majority of participants were well informed when appraising the advantages and disadvantages of steroid-use, with the former bearing more weight. This finding is consistent with the existing research as the majority of steroid-users appear to have sufficient knowledge regarding the side-effects associated with steroid-use (e.g., Chng & Moore, 1990; Tricker, O'Neil & Cook, 1989), and have not been dissuaded from using the drug. Conversely, some steroid-users may still take steroids without possessing knowledge of all the facts, and potentially exposing themselves to myriad negative side-effects and other implications.

For normative beliefs, participants perceived that most other people such as 'non-users and wider society' believe that they should not use steroids. This is an unsurprising finding considering current legislation in the UK, which prohibits the non-prescribed use of steroids with possession and intent to supply, potentially leading to imprisonment (ACMD, 2010). Therefore, legal status (and attendant discourse of 'criminal behaviour') may inculcate strong negative public perceptions towards steroid-use. This assertion can support the suggestion that legal changes can influence public perceptions. Various studies

(e.g., Fong et al [2006] longitudinal studies) have showed how consensus public views on smoking shifted *after* changes in legislation.

Current legislation was perceived by participants to be a potential barrier to non-prescribed steroid-use - albeit one that respondents had been able to circumvent. Nevertheless, legalisation would obviously allow steroids to be more accessible, and would make the need to identify a reliable supplier redundant, as well as ensure a degree of quality of the product. Despite this, political reluctance from the British Government has firmly opposed any such moves towards decriminalisation due to fear that this would lead to increased drug use, and negatively influence the community (McKeganey, 2007; Singer 2008). However, these arguments appear to be based on speculation rather than factual evidence on effects.

D.2. Research Question 2.

The findings have indicated some novel insights that can help to explain an individual's steroid-use outside of the TPB framework. Specifically, these insights were informative about the current and historical contextual factors or setting conditions that can potentiate favourable beliefs about steroid-use (in terms of both their development and degree of influence). For example, several participants reported that they started to use steroids due to a reduction in their natural testosterone levels. Research indicates that at age 30 there is a decrease in men's natural testosterone levels, a reduction of 1 percent annually, which is normative to the aging process and may lead to a number of side-effects such as a reduction in sex drive, sperm production, strength and muscle mass and the ability to decrease body fat. Additionally, emotional changes can lead to an individual experiencing depression, and an overall reduced sense of wellbeing (Mayo Clinic, 2012). A study by Cohen, Collins, Darkes and Gwartney (2007) found that men who were over the age of 30 or older used steroids to reduce their body fat, whereas younger men under 30 were mainly concerned with increasing muscle mass. Further research into these phenomena will be advantageous. Arguably, this finding may still fit with broad behavioural beliefs about the beneficial effects of steroid-use on physical appearance and health,

but it is a start to identifying setting conditions that may moderate influence of these beliefs.

Another participant reported that he started to use steroids for “protection”. Although the TPB questionnaire does not go into depth about how an individual’s beliefs were formed (representing a limitation of the measure), it could be that in some instances users engage in steroid-use to reduce perceived vulnerability of abuse from others by enhancing their strength and physical size. Therefore, if one perceives himself as being physically bigger than the average person, he is less likely to feel victimised and therefore feels safer. Based on these self-identified aetiological factors, an individual’s current use may be maintained by his beliefs about the positive outcomes of steroid-use such as an increase in muscle size and strength (Nilsson, Baigi, Marklund & Fridlund, 2001). Alternatively, operant conditioning principles may also explain this maintenance cycle (see Skinner, 1953). For example, steroid-use may become habitual if it is rewarding (i.e., enjoyable, helping to achieve one’s objectives), positively reinforced, helps to avoid something aversive (i.e., anxiety of feeling vulnerable, a fear of the side-effects of decreased testosterone levels) and is negatively reinforced. Thus, both types of reinforcement will increase the likelihood of habit formation (the ‘addiction cycle’).

Findings indicated that participants learned about steroids from a variety of sources such as from the internet (e.g., bodybuilding forums, journals, articles), other bodybuilders and friends and from reading books. Participants appeared capable of conducting research into steroids in pursuit of improving their knowledge, as well as their problem-solving and decision-making abilities. This is likely to be due to the self-prescribing requirements of the drug and the potential implications of incorrect administration. Furthermore, for users, this information-seeking behaviour may help to alleviate the anxiety regarding the uncertainty of administering the drug (e.g., correct dosage, drug effects, and adverse effects) (Tahamtan, Farahi, Afshar & Baradaran, 2015).

Findings regarding the participant's body image and self-evaluations showed that they appeared to conflate their feelings with thinking when answering questions about how they felt about their body. Furthermore, there was an overlap in responses when answering what they thought about their body and the way they looked. Interestingly, just under half of the participants reported that they were satisfied and had a positive affect towards their bodies, whereas, the majority were either partially satisfied (i.e., work in progress) or unsatisfied and had a negative affect towards their bodies. A possible explanation is that participants intended to use the drug when they were not satisfied with their appearance, and once they used it subsequently became satisfied. Their intention to use steroids subsequently remained positive since they were concerned with losing their improved appearance (Cafri et al., 2005). Once again, negative reinforcement may become increasingly influential in the maintenance of behaviour (sustaining gains). This finding appears consistent with the existing literature as participants may become dependent on steroids for their anabolic effects due to their pathological concerns about muscularity (Kanayama, Brower, Wood, Hudson & Pope, 2010) and body image (Kanayama, Pope & Hudson, 2001), which may be fuelled by the media's often unrealistic portrayal of masculine physique. Exposure to exaggerated masculine images in the media may influence some males to desire a more masculine physique at an early age. Research conducted by Field et al. (2005) has found that boys were twice as likely to use substances to improve their appearance after being exposed to such media images. However, it is worth noting that we are all exposed to media images, and many choose not to use steroids to improve appearance. This therefore warrants further exploration.

The role of social feedback in the form of positive remarks towards steroid-users (e.g., regarding their physical appearance) may help to build their self-esteem and confidence, whereas negative social feedback (e.g., "lost size") may have the opposite effect. Nevertheless, this social feedback (both positive and negative reinforcement) may increase the likelihood of an individual continuing to use steroids and is consistent with Skinner's operant conditioning theory.

Finally, the findings revealed that some participants made positive health and lifestyle choices (e.g., “stopped using drugs”, “don’t drink or smoke anymore”) since starting using steroids. It could be hypothesized that these individuals believe that the use of additional substances while using steroids may reduce the effectiveness of the drug, and such use may be a conscious harm reduction initiative (e.g., a perception of being susceptible to negative health consequences of taking additional drugs) and a protective strategy to avoid those consequences.

D.3. Phase Two: Research Question 1.

As discussed in the Journal Paper, the results from this study support the application of the TPB with regards to a wide range of behaviours. However, our results that offer approximately 17% of the variance explained in intention are not consistent with McEachan et al.’s (2011) meta-analysis, which found that the TPB variables can explain 44.3% of variance in intention. There is also Allahverdi pour et al.’s (2012) study, which found that the TPB variables accounted for 63% of the variance in intention to use steroids. However, our study’s findings were similar to those of Enaker’s (2013) study, which found that the TPB variables explained 15% of the variance in intention to use steroids. Therefore, such a large discrepancy warrants future research with this population. Nevertheless, our results showed that attitude had the strongest relationship with behavioural intention, which was followed by PBC and is consistent with several meta-analyses (Armitage & Conner, 2001; Cooke & French, 2008; McEachan et al., 2011).

As discussed in the Journal Paper, the subjective norm construct was removed from the analysis due to its low internal consistency and the fact that it did not significantly correlate with intention. This finding is consistent with the exiting literature, which has found that the subjective norm construct is the weakest predictor of intentions across a range of health-related behaviours (Armitage & Conner, 2001; Povey, Conner, Sparks, James & Shepherd, 2000; Sparks, Shepherd, Wieringa & Zimmermanns, 1995). Inspection of the SPSS output for subjective norms revealed that there was a significant negative moderate correlation between two items, implying that there were two separate

pressures. Technically these items should not have been added together or combined in a different way, as they are separate entities. Nevertheless, as discussed above (in the results chapter), the removal of a certain item to improve the Cronbach's alpha within the subjective norm scale did not make a difference to the model's predictive ability (accounted variance explained) of intentions. Therefore, a subtle difference between broad societal norms versus group norms (norms within groups that individuals identify with are most important) may exist. Interestingly, the fact that participants knew that wider society and the opinions of significant others would disapprove of their use of steroids indicates that they were fully aware of the social norm. Nevertheless, participants still had a strong intention to use steroids in the future, and this may indicate that the stigma associated with steroid-use could be decreasing. This could be the consequence of the increasing presence of steroids in society over the past decade (Government Accountability Office, 2005). However, this will need to be explored further before making definitive societal generalisations from a steroid-user sample.

Although normative beliefs were significantly correlated with subjective norms and indicates that this indirect measure was well constructed and adequately reflected the range of the measured construct, this construct did not have a significant correlation with intentions and was therefore removed from the analysis. Furthermore, normative beliefs have received criticism on account of narrow conceptualisation (e.g., Terry & Hogg, 1996). It could be hypothesised that participants may perceive negative social pressures and hold the belief that most other people, including family members, and partners, would disapprove of their steroid-use. Despite these social pressures, they may not feel a general motivation to comply with significant others, and they still may retain a strong intention to use the drug. The Social Learning Theory (Bandura, 1977) proposes that a person may be affected by how common he or she believes steroid-use to be within the general population, as well as how common it is among those individuals in the same group such as other recreational gym-users who are considered as successful in achieving their goals (e.g., increased muscle mass, improved appearance). Therefore, a person who believes that steroid-use is more common among these successful individuals may be more

likely to use them himself irrespective of whether or not he believes it to be commonplace within the general population. This highlights a nuance within norms (societal versus identified group norms).

As discussed in the Journal Paper, although the removal of the controllability items improved the Cronbach's alpha within the PBC scale, this process significantly reduced the models predictive ability (accounted variance explained) of intentions. Some authors such as Beale and Manstead (1991) have found weak internal consistency (reliability) of items designed to measure the PBC construct. Nevertheless, the predictor variable PBC was not a significant independent variable for predicting intentions. Overall, participants in this study had strong feelings of confidence and ease concerning steroid-use (self-efficacy), and a strong belief that the decision to use steroids was in their control and was completely up to them (controllability). Evidently, these intrinsic and extrinsic factors strongly influenced their intentions. Future research with this population will need to be conducted pertaining to PBC and its predictive ability concerning steroids.

Control beliefs were not significantly correlated with PBC, highlighting the fact that the indirect measure did not adequately reflect the range of the measured construct. Alternatively, it may mean that it lacked sensitivity within this particular sample (steroid-users) at this time, suggesting that they have ready access to/self-efficacy for using steroids. However, these items were based on the experiences of users and may capture factors that could be barriers to or facilitators of use at various points (e.g., when first 'getting into' steroid-use or at times when access is more difficult). Nevertheless, control beliefs did not have a significant correlation with intentions and was therefore removed from the analysis. It could be hypothesised that participants had an awareness of the factors that would likely enable or prevent their steroid-use (control beliefs), such as being able to identify a reliable supplier, as well as a perception of the extent to which of these factors made it easier or more difficult to use steroids (perceived power to influence behaviour). In spite of this, this construct warrants further exploration within this population.

D.3.1. Behavioural Beliefs and Attitudes towards Steroids

The results of the analysis reported in the Journal Paper indicated that attitudes might mediate the effect of underlying behavioural beliefs (BB x OE) on intention (to use steroids again within the next six months). This could be inferred from (1) significant zero-order correlations between: (a) behavioural beliefs and intentions, (b) behavioural beliefs and attitudes, and (c) attitudes and intentions; in combination with (2) the finding that, when attitudes and behavioural beliefs were modelled as concurrent 'predictors' of intentions, only the relationship between attitudes and intentions remained significant. This suggests that any relationship between behavioural beliefs and intentions could be accounted for by the relationship between attitudes and intentions. The inferred mediating pathway would be (partly) consistent with hypothesised pathways within the TPB model. To examine mediational pathways more directly, as well as test inferences from planned Journal Paper analyses, we constructed a full mediation model (incorporating multiple independent and mediating variables simultaneously) using the procedures outlined in Hayes and Preacher (2014). Specifically, the mediation model included the following: three hypothesised independent variables (behavioural beliefs, normative beliefs, and control beliefs); three hypothesised mediating variables (attitudes, subjective norms, and PBC); and one outcome variable (behavioural intentions). Figure 8 below represents the outcome of this analysis, depicting all significant pathways ($p < .05$) within the mediation model. As can be seen, the indirect (attitudes-mediated) pathway from behavioural beliefs to intentions was significant ($b = .02$, 95% CI .01-.05); in combination with the non-significant direct effect, this suggested that the relationship between behavioural beliefs and intentions was largely mediated.

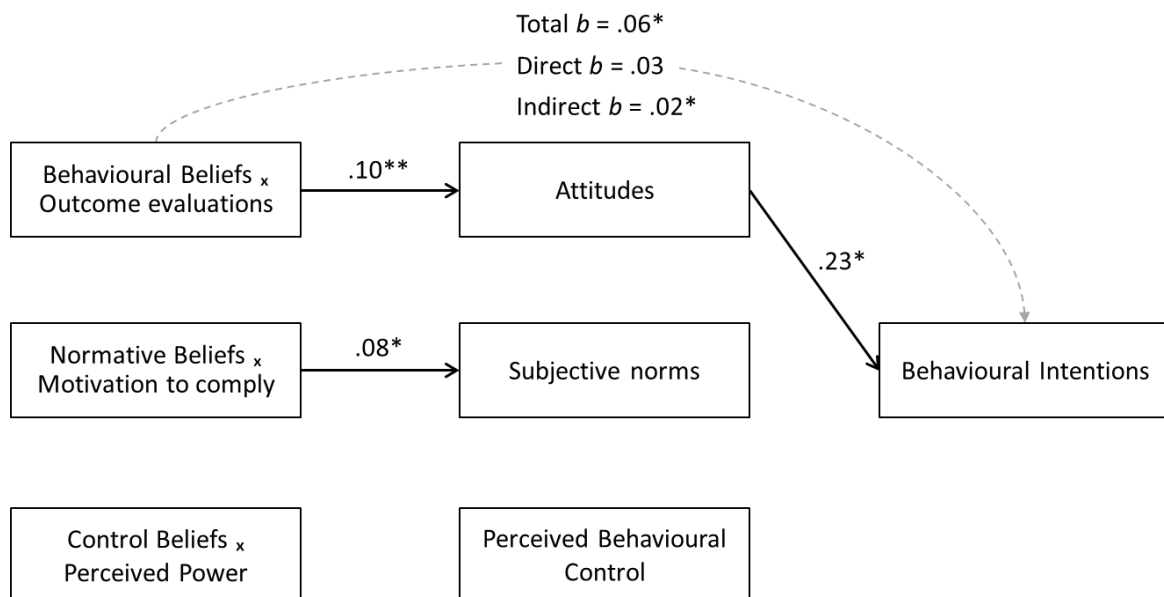


Figure 8. Model of mediational pathways posited in the Theory of Planned Behaviour

Note. Figure 8 depicts statistically significant pathways and beta coefficients. * $p < .05$, ** $p < .01$

Thus, mediational analysis provided support for one of the three indirect pathways hypothesised by the TPB model. Within this specific sample (current steroid-users), normative and control beliefs appeared to be less important in accounting for future steroid-use intentions.

The above findings are consistent with Ajzen's model, which suggests that attitudes develop from beliefs that individuals hold about the object (i.e., steroids), and are associated with particular attributes. In this case, the participants' positive attitudes towards steroids are linked to each belief that their use will have a positive outcome. In this sense, steroid-users learn to favour steroid-use because they believe it to have largely desirable consequences. However, Eiser (1994) criticised the assumption that behavioural beliefs usually predict attitudes, and suggested that different beliefs will become more prevalent at different times. Therefore, attitudes may not inevitably be driven by behavioural beliefs, but beliefs might arise from attitudes or behaviours. In spite of that, the behavioural beliefs measure was significantly correlated with attitude, which means that the measure was well constructed and reflected the measured construct.

D.4. Phase Two: Research Question 2.

This question has already been addressed in the Journal Paper.

D.5. Phase Two: Research Question 3.

Some of the underlying behavioural beliefs warrant additional examination. For example, even though there were clear differences between the groups in favour of steroid-use, non-steroid-users also acknowledged that steroid-use would increase the likelihood of achieving desired outcomes and favourably evaluated these consequences (e.g., an increase in strength). Equally, both groups reported that steroid-use would involve the likelihood of negative side-effects (i.e., internal and visible/physical), which were evaluated unfavourably, though rated as being more problematically for non-steroid-users. Similarly, non-steroid-users reported that they thought steroid-use would increase the likelihood of behavioural and psychological consequences (e.g., mood swings, drug dependency). Conversely, this perspective was not shared by steroid-users. Both groups evaluated these beliefs as being disadvantageous, but non-steroid-users scored higher on this count. Therefore, the beneficial and consequential properties of steroid-use appear to be broadly acknowledged by both groups. However, steroid-users have been found to have an increased knowledge base regarding use (e.g., side-effects, long term health consequences) than non-steroid-users, though this did not dissuade them from using steroids (Tricker, O'Neil & Cook, 1989; Chng & Moore, 1990). This may be attributed to the steroid-using groups' strong desire to improve their physique and appearance which is driven by their body dissatisfaction and image concerns (Neumark-Sztainer, Story, Falkner, Beuhring & Resnick, 1999) or body dysmorphia disorder (Nilsson, Spak, Marklund, Baigi & Allebeck, 2005). Furthermore, exposure of the media's idealistic representation of masculinity and male body ideal may contribute to an individual's decision to use steroids (Field et al., 2005). Interestingly, although some steroid-users may believe that excessive or long-term steroid-use is potentially harmful, they still carry out this behaviour. Theoretically, this apparent internal conflict between their beliefs and actions may lead to cognitive dissonance (see Festinger, 1957) and thus mental discomfort. In such cases, a steroid-user may deal with this cognitive dissonance by changing the way they think in order to correspond more closely

with their steroid-use. Furthermore, they might rationalise that their steroid-use is not actually as dangerous as their original fears, which were misinformed and outdated, and be more likely to dismiss and/or minimise the existence of side-effects in the future. Conversely, although non-users acknowledged some of the advantages of using steroids, they appear to have significantly greater beliefs and fears of the negative side-effects and health implications associated with steroid-use, which carries more weighting and prevents them from using the drug. Therefore, for the non-user the idea of risk-taking is too threatening and maintains their negative behavioural beliefs, negative attitudes, and intentions to not use steroids.

For the normative beliefs, both groups had the perception that several referents would disapprove of steroid-use (e.g., *“most other people and non-users”*). An interesting finding was that partners were perceived to provide either positive support for steroid-users or negative pressure for non-steroid-users, with both groups desiring to comply with their wishes. This suggests that although the partners of steroid-users might have opposed steroid-use, they nonetheless supported their partner’s decisions. The family was perceived to be the greatest pressure against steroid-use with both groups also wanting to comply with the opinions of family members. Bodybuilders and gym-users were considered to be supportive of steroid-use, with both groups endorsing a desire to comply with them. Athletes and coaches were perceived as slightly supportive of steroid-use for users, though not for non-users. However, both groups had a desire to comply their views. Intriguingly, a misconception appears to exist in the public’s consciousness that the majority of bodybuilders use steroids to increase their athletic performance or to build muscles (Dunning & Waddington, 2003).

From control beliefs, it was expected that steroid-users would be able to identify a reliable supplier, whereas this would not usually be expected in the case of non-steroid-users. Additionally, steroid-users believe that they could be *“certain about the quality”* of the steroid, though this view is not shared by non-steroid-users, and any uncertainty about the quality of the steroid would make both groups less likely to use them. Although not significantly different, both

groups agreed that “*made legal*” and “*accessible over the counter*” would also make the individuals in each group more likely to use steroids, though they evaluated legalisation as being unlikely. This finding was expected as steroids are currently prescription-only medicines in the UK and therefore illegal to take or own without a prescription (NHS, 2013).

Several studies (e.g., Ajzen & Fishbein, 1980; Johnston & White, 2003) have conducted belief-based analyses in order to increase our understanding of health-related behaviours, some of which were especially concerned with the underlying beliefs connected to a unique population. Identification of salient beliefs, especially behavioural beliefs as found in this study, is an important process since such beliefs play a fundamental role in developing an individual’s attitudes towards influencing intentions to act or not act (i.e., use steroids or not use steroids). This information may be useful during a clinical intervention as it may encourage behavioural change. The suggestion is that both groups’ underlying individual beliefs have been shaped via their life experiences (e.g., exposure to different cultures, mass media influences), which will then subsequently influence their intentions to use steroids or not. In practice, clinicians should be encouraged to examine the research outcomes for their clinical relevance instead of just reviewing the statistical significance, as they do not provide clinical insight (Page, 2014). Statistical significance tells us about the likelihood that our (aggregate) findings are due to chance/will not be replicable in future investigations. Although our findings were statistically robust (average associations were greater than we would expect due to chance) and likely to be observable in other group studies representing these populations, they do not tell us about the practical importance or clinical meaning of responses from a particular individual. For example, whether a given response (or change in responses) would tell us anything that would alter how we work with someone (e.g., in terms of intervening preventatively or monitoring treatment progress and readiness for discharge). Clinically, there appears to be some overlap between the statistical findings for a large amount of the underlying beliefs for steroid-users and non-users without a clear break point to cluster them into objective clear categories to identify individuals who may be potentially at risk of using steroids in the future. Despite this observation, there

is potential for future research to help resolve some of these unanswered questions and there is still potential for current clinical relevance as discussed below.

D.6. Strengths and Limitations

As discussed in the Journal Paper, several strengths and limitations of the study were highlighted and the sections below expand on those descriptions provided.

D.6.1. Strengths

This study provided one of the first detailed and transparent accounts of an elicitation phase during the development of a TPB measure. It also included a thorough outline when checking the assumptions of statistical tests during the preliminary analyses. Both of these processes seem to have been severely overlooked in past research papers, which raises questions about the reliability and validity of the construction of some of these questionnaires. There are numerous advantages of using theory-driven approaches (Sidani & Braden, 1997), especially when using a mixed methodology. For one thing, it helped to scaffold the design of this study during the development of the TPB measure. Furthermore, it helped to inform the selection of variables used for statistical analysis and to direct the interpretation of findings whilst enhancing the validity of conclusions. Finally, as there continues to be an increase in the number of young men using steroids, research into this trend is timely. It is possible that the TPB will improve clinical relevance due to the applicability of our findings.

D.6.2. Limitations

The TPB measure used for this study was in its first iteration. Although content and construct validity were established, the latter may be improved, especially in constructs that did not perform as well as others. Therefore, establishing a test-retest reliability of the measure will lead to the construction of a more valid instrument, and this should be done before drawing any absolute conclusions pertaining to the application of this theory as a definitive predictor of future intentions. A question to validity is the fact that the measure used in the study measured intention rather than actual behaviours. Although the TPB

proposes that intentions are assumed to be the direct antecedent of behaviour, this assumption has been called into question (e.g., Rhodes, Plotnikoff & Courtney, 2008; Sheeran, 2002). However, Greve (2001) argues that a logical connection exists between action and intention in the respect that actions are intentional behaviours. Notably, though intentions are regarded as the central driver of actions, they should not be considered the causes of actions. This implies that intentions are a fundamental component of a purposeful action, but not its cause. Furthermore, there have been several studies (e.g., Armitage & Conner, 2001; Aylaz, Erci & Erten, 2011; Fen & Sabarunddin, 2008; Hassandra, Vlachopoulos, Kosmidou, Hatzigeorgiadis, Goudas & Theodorakis, 2011; McEachan et al., 2011) investigating health-related research based on Ajzen's TPB that have found that attitudes, subjective norms and PBC constructs to be antecedents of behavioural intentions.

During recruitment, there was a high proportion of non-participation, which raises questions about systematic bias in sampling. This questions whether those who did take part were representative of those who did not, which may potentially lead to expert user recruitment. Self-selected samples are usually participants who are highly motivated to engage in research procedures.

Using a cross-sectional design may have led to artificial inflation of explained variance, as well as limiting the generalisability of the findings, as data was collected at only one point in time. Although the questionnaire used a period of six months to help orientate the participants, it did not take into consideration how other variables (e.g., psychological) may have influenced current steroid taking behaviours. Future research might utilise a longitudinal design to determine the extent to which intention predicts subsequent behaviour.

D.7. Clinical Implications

Several clinical implications were discussed throughout the Journal Paper and the following points aim to extend on some of the descriptions. Our findings from the study provide a range of useful information that can be used in an attempt to understand an individual's steroid-use or non-use. It can also help

clinicians to provide interventions that may be effective in changing the habits of steroid-users (van Ryn & Vinkur, 1990). Ajzen (1991) suggests that the variables of attitude, subjective norm, PBC can account for the different aspects of behavioural intention and therefore represent particular points to target when attempting to change it. Furthermore, the underlying belief-based measures provide a detailed account that is required to understand the antecedents of behavioural intentions. Therefore, it is at this level of beliefs that will allow us to understand the salient components that influence one person's strong intentions to use steroids and why another person may follow a different path. Additionally, by collaboratively conducting a functional analysis and by drawing on evidence-based practices such as cognitive behaviour therapy (CBT) for substance use it may be possible to help an individual identify problematic thoughts, feelings and behaviours before and after steroid-use (McHugh, Hearon & Otto, 2010). CBT interventions will focus on providing both cognitive and behavioural and coping strategies (e.g., targeting unhelpful beliefs, skills building, motivation) (Carroll, 1998). Finally, clinical psychologists are adequately trained to offer a range of services to service-users (Miller & Brown, 1997). They currently work alongside needle exchange and mental health services by providing psycho-education to health-care professionals and service-users in order to increase awareness of the possible side-effects of using steroids.

D.8. Future Research

This section below expands on the Journal Paper and outlines some additional avenues for future research. It would be useful to conduct in-depth interviews during the elicitation study, which may help to uncover more entrenched beliefs pertaining to steroid-use. It may also shed light on how an individual's beliefs were formed and the psychological origins of his steroid-use. These findings may enhance the development of the individual belief-based measure, which may lead to a more significant contribution towards the overall regression model. Another direction for future research may involve investigating the psychological similarities and differences between younger and older steroid-users across the TPB components. For example, younger and older users might have significantly differing underlying beliefs, attitudes,

subjective norms and PBC regarding steroid-use, which may help to identify specific points to target for behavioural change.

E.1. Critical Reflections

The process of critical reflection helps a researcher to learn from his or her research experiences while utilising these reflections to guide future research and professional practice. Walker, Read and Priest (2013) suggest that the process of completing a doctoral research project is not purely about the academic work being completed, but also involves a journey of self-development and the acquisition of important transferrable skills. Furthermore, Murray and Kujundzic (2005) propose that reflections regarding the process of conducting research should be set within a broader context. Therefore, this reflective section will include personal motivations for wanting to conduct this research, as well as exploring theoretical, epistemological and methodological considerations.

E.1.1. Personal Motivations

Whilst contemplating this research project, I wanted to pursue an area of clinical psychology that I found interesting and which would be pertinent to my future career aspirations. By utilising my experience of training in various gyms for over 14 years, including my interactions with steroid-users and clinical experience of working with service-users with substance misuse problems, I believed that I could contribute to this research area. After several discussions with my research supervisions, it became evident that the development of a TPB measure may be beneficial within clinical practice. The instrument may be instructive in understanding an individual's steroid-use or non-use. It may also help open avenues for later behavioural change and potentially reduce the risks associated with steroid-use.

E.1.2. Theoretical Considerations

Reflection on theoretical issues related to the TPB highlights that a substantial amount of variance in intention to use steroids remains unexplained, as discussed in the Journal Paper. Notably, this may partly reflect the specificity of the sample and limited variance in target intentions: i.e., applied

questionnaire in a group of current users who typically had strong intentions to use again within the next six months (likely that much of the remaining variance to be explained in [generally high] intentions reflects idiosyncrasies of response style and random variation). Furthermore, it is likely that explanatory power may increase in more diverse samples (and evidence for this from relatively high variance explained when comparing users versus non-users in own data) or with different timeframes or foci of intentionality. Moreover, we have yet to examine whether the measures of intention used in this study were associated with subsequent behaviour (question of whether intention questions had validity).

Additionally, the model does not account for other variables that influence behavioural intention and motivation such as past behaviour (Rhodes & Courneya, 2003). However, Ajzen (1991) would argue that if all conditions, internal or external to the individual are determinate of a given behaviour then it may be possible to predict that behaviour to the limitation of the measurement. Therefore, if these factors remain constant over time, including behaviour, the assertion, “past behaviour is the best predictor of future behaviour” (i.e., influencing future intention), will be fulfilled. Ajzen also suggested that repeated behaviours may become habit forming without the mediation of attitudes, subjective norms, perceptions of control or intentions. In spite of this, it should be acknowledged that, although past behaviour may reflect the impact of determinants that influence later intentions or behaviour, it should not be viewed as causative (see Ajzen, 1987). Nevertheless, a more thorough understanding about the factors that increase an individual’s intention to use steroids may be reached through an integration of other theories that focus on their respective features, such as emotional and motivational antecedents. In future research the TPB will serve as an important framework within a larger integrative model, which may help to illuminate the antecedents that are translated into intentions. Notably, Ajzen (1991) suggests that the TPB is inclusive of supplementary predictor variables as long as they are able to acquire a significant amount of the variance in intention or behaviour after the theory’s current variables have been acknowledged.

Although it is not standard practice within the TPB literature to include non-TPB questions within the elicitation/pilot TPB questionnaire, this decision appeared to be advantageous. This process enhanced the development of the TPB measure by providing additional information that the standard TPB questions missed. However, I am left contemplating whether an interview may have uncovered these additional beliefs. Nonetheless, the time and resource restraints meant that this was not a variable option and the questionnaire format was the most efficient and economical choice.

E.1.3. Epistemological and Methodological Considerations

During my previous research (e.g., at the undergraduate and post-graduate levels), I favoured and used quantitative data, methodologies and models from a positivist stance since these approaches felt most comfortable. They also appeared to take priority in academic psychological research (e.g., Smith, Harre & van Langenhove, 1995), with journal editors seemingly more inclined to adopt these conventional models of research (Barker, Pistrang & Elliott, 2002). Irrespective of my assumptions, which may now be outdated, I contemplated whether the subtleties of such perplexing beings such as humans could be reduced to absolute mathematical data, which I felt was insufficient to understand human behaviour. I endeavoured to expand and develop my research skills by using a mixed methodology, which did not discount my original quantitative roots, as my underlying theoretical assumptions appeared to be shifting. I therefore adopted a critical realist position. This caused me a degree of anxiety on account of the unfamiliar approach, and it was difficult to accept that all our understandings are ultimately provisional. Furthermore, it was essential to acknowledge that my own expectations, experiences (e.g., training in various gyms) and subjective bias must inevitably influence the research process. This is because of the types of questions that were asked, the analyses used, and interpretation of the findings and the development of hypotheses for unexpected findings. Although, I have not used steroids myself, I believed that it was important to be mindful of interpretation biases in the research process instead of ignoring them (Finlay, 2009). However, I believe this experience has allowed me to challenge and re-evaluate my own assumptions regarding what contributes to good research whilst managing my

own internal conflicts. I believe that an exploratory sequential design has helped to achieve this, and it has also helped me to develop my confidence.

I found the process of using a mixed methods approach extremely challenging due to my unfamiliarity with it, and also because of the complexities of data analysis. It required extensive reading and the re-running of analyses during the quantitative phase when problem solving. I was also required to make informed decisions regarding the assessment of the assumptions for the statistics tests and during the reliability checks (e.g., internal consistency analysis). Nevertheless, a mixed method approach helped to capture a variety of explanations that offered an account for steroid-use and non-use.

During the research process, I felt frustrated with some of the substantive ethical issues. For instance, it was troublesome to make several ethics applications for each phase of the study. We also had to amend and update various versions of the TPB questionnaires such as changing minor wording for some questions, which delayed the recruitment process at each phase. However, I managed my frustrations during supervision and utilised my time effectively whilst focusing on other areas of the study before I could begin recruiting. This strategy appeared to be beneficial as I felt like I was utilising my time constructively and I will continue to adopt this flexible work ethic for future research.

During recruitment from a natural bodybuilding forum, I was surprised at the hostility directed towards those who used steroids, and that some members considered steroid-use cheating. Some forum members voiced their strong opinions and categorised steroid-users with heroin-users due to injecting practices, which I thought was unwarranted. Upon reflection, although I can understand that steroid-use can quickly enhance one's muscular development, there still appears to be a strong negative stigma associated against steroid-use, even within different sections of the bodybuilding community. Nevertheless, some forum members seemed more receptive to the study as they themselves might have been ex-steroid-users, or knew of someone they could signpost to the study. Similarly, whilst recruiting from another

bodybuilding forum that promoted the use of steroids, my study received a mixed reception. One on hand, some forum members were extremely enthusiastic and wanted to share their experiences of steroid-use, whereas other members appeared cynical and suspicious of my study. I occasionally felt the need to justify my study in order to be credible. Thankfully, the forum administrator was highly supportive, which I believed helped to encourage participation.

Overall, I believe that the recruitment strategy (i.e., snowballing technique, convenient sample) from various online social media was extremely effective, as I reached my target number of participants without needing to continue with the additional NHS recruitment strand, which potentially could have delayed the analyses for phase two. However, I believe that this study may not have attracted enough diversity within the steroid-using community as several users may not have had access to the internet, and many that did might not have used bodybuilding forums or accessed needle exchange services. Therefore, future studies may be needed to widen recruitment directly from gyms and increase the potential for this community to have a more representative voice.

Finally, conducting this study has been an extremely challenging experience whilst working towards a doctorate in clinical psychology. The process of conducting an ambitious two-phased piece of research whilst balancing the other demands of the course has been logistically difficult. It has been especially challenging to maintain the continuity and fluidity required to complete this research project while maintaining my personal motivation. Nevertheless, it has helped to enhance my resilience, time management skills and research and decision making skills whilst embracing the challenges and facing the uncomfortable uncertainties that are part of the territory when it comes to projects of this nature. Overall, I believe that this experience will help to prepare me for future projects in both clinical and research practice upon completion of my doctorate course.

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Appendices

Appendix A: Protocol

Title: Examining psychosocial factors associated with adolescents' anabolic androgenic steroid use among gym users: a systematic review

Background and Aims: Anabolic androgenic steroids have been associated with psychological and physical health-related problems and it has emerged that it is an increasing problem among the male adolescent recreational gym user. This review aimed to examine the psychosocial factors predicting anabolic androgenic steroids use in the adolescent user and the Theory of Planned Behaviour was used to conceptualise these factors within a psychological model. It also examined the difference between the adolescent steroid-user and non-steroid-user.

Proposed search strategy and databases: Searches were conducted on electronic databases via the social science and medical databases systematically, including (with period covered): PsycINFO (1806 to July Week 2 2013), EMBASE (1974 to 2013 July 11), MEDLINE (R) (1946 to July Week 1 2013) and Allied and Complementary Medicine (AMED; 1985 to July 2013). Google Scholar was searched to identify any additional relevant papers.

Information Sources and electronic pilot searches: The literature review started with a pilot search within the PsycINFO database (a primary database for psychological sciences) via the electronic database from Nottingham University. The pilot searches assessed and developed the viability of the inclusion/exclusion criteria, including the identification and refinement of appropriate terms. The initial pilot searches were conducted using the following terms under each of the four keywords (1) 'adolescenc\$', (2) 'anabolic androgenic steroids', (3) 'psychosocial', 'attitude\$', 'motivation', 'behavio?r', 'intention', 'belief\$', 'subjective norm', 'psychosocial', 'perceived behavio?ral control' and (4) 'weightlifting', 'weight training', 'gym', 'bodybuild*'. These searches combined the four keywords by the 'AND' function.

The above terms within each keyword established by PsycINFO were mapped to the subject heading and appropriately combined using the selection auto-exploded and 'OR'. The original pilot search produced a limited amount of relevant papers and this process of piloting searches was subsequently repeated until the following terms were established under each of the three keywords. (1) 'adolescenc\$', 'teenager\$', 'youth', 'juvenile', 'boy\$', 'junior', 'male\$', (2) 'steroids', 'androgens', 'anabolic androgenic steroids', 'anabolic agents', 'performance enhancing substance', 'performance enhancing drugs', and (3) 'psychosocial', 'attitude\$', 'intention', 'belief\$', 'social norms', 'subjective norm', 'psychosocial', 'self efficacy or perceived behavio?ral control'. These searches combined the three keywords by the 'AND' function and are highlighted in the Search Strategy Table below.

Search Strategy Table		
Database	Time of search	Search Strategy Keywords and (Results)
PsycINFO (OVID)	1806 to July Week 2 2013	#1 Adolescenc\$.mp. (183849) #2 Teenager\$.mp. (6439) #3 Youth.mp. (53554) #4 Juvenile.mp. (26419) #5 Boy\$.mp. (58483) #6 Junior.mp. (21916) #7 Male\$.mp. (346491) #8 exp Steroids/ or exp Androgens/ or anabolic androgenic steroids.mp. (19604) #9 anabolic agents.mp. (9) #10 performance enhancing substance.mp. or exp Performance Enhancing Drugs/ (191) #11 psychosocial.mp. (81028) #12 attitude\$.mp. (315928) #13 intention.mp. (24075) #14 belief\$.mp. (93383) #15 exp Social Norms/ or subjective norm.mp. (5856) #16 psychosocial.mp. (81028) #17 exp Self Efficacy/ or perceived behavio?ral control.mp. (14739) #18 1 or 2 or 3 or 4 or 5 or 6 or 7 (582215) #19 8 or 9 or 10 (19765) #20 11 or 12 or 13 or 14 or 15 or 16 or 17 (470747) #21 18 and 19 and 20 (338) #22 limit 21 to (human and English language). (283)
MEDLINE (R) (OVID)	1946 to July Week 1 2013	#1 Adolescenc\$.mp. (1621836) #2 Teenager\$.mp. (9786) #3 Youth.mp. (36980) #4 Juvenile.mp. (59873) #5 Boys.mp. (57196)

		<p>#6 Junior.mp. (9099)</p> <p>#7 Male/ (6547537)</p> <p>#8 Androgens/ or Anabolic Agents/ or Steroids/ or anabolic androgenic steroids.mp. (56324)</p> <p>#9 performance enhancing substance.mp. or Performance-Enhancing Substances/. (263)</p> <p>#10 psychosocial.mp. (56970)</p> <p>#11 attitude\$.mp. (299954)</p> <p>#12 intention.mp. (32347)</p> <p>#13 belief\$.mp. (46914)</p> <p>#14 subjective norm.mp. (390)</p> <p>#15 social norm.mp. (265)</p> <p>#16 perceived behavioral control.mp. (678)</p> <p>#17 1 or 2 or 3 or 4 or 5 or 6 or 7 (7026594)</p> <p>#18 8 or 9 (56527)</p> <p>#19 10 or 11 or 12 or 13 or 14 or 15 or 16 (402408)</p> <p>#20 17 and 18 and 19 (242)</p> <p>#21 limit 21 to (human and English language)</p> <p>(222)</p>
EMBASE	1974 to 2013 July 11	<p>#1 adolescen\$.mp. (1312707)</p> <p>#2 adolescent/ (1251649)</p> <p>#3 youth.mp. or juvenile/ (50007)</p> <p>#4 boys.mp. (73592)</p> <p>#5 junior.mp. (12284)</p> <p>#6 male/ (5870543)</p> <p>#7 androgen/ or anabolic agent/ or anabolic androgenic steroids.mp. or steroid/ (150967)</p> <p>#8 performance enhancing substance.mp. or performance enhancing substance/ (154)</p> <p>#9 psychosocial.mp. (85185)</p> <p>#10 attitude\$.mp. (358067)</p> <p>#11 intention.mp. (37541)</p> <p>#12 belief\$.mp. (60284)</p>

		#16 1 or 2 or 3 or 4 or 5 or 6 (6344573) #17 7 or 8 (151077) #18 9 or 10 or 11 or 12 or 13 or 14 or 15 (505375) #19 16 and 17 and 18 (707) #20 limit 19 to (human and English language) (638)
AMED Allied and Complementary Medicine (OVID)	1985 to July 2013	#1 adolescen\$.mp. (4308) #2 Teenager\$.mp. (110) #3 youth.mp. (616) #4 juvenile.mp. (325) #5 boys.mp. (866) #6 junior.mp. (171) #7 male\$.mp. (13566) #8 anabolic androgenic steroids.mp. (5) #9 steroids.mp. (545) #10 androgens.mp. (47) #11 anabolic agents.mp. (0) #12 attitude\$.mp. (10850) #13 intention.mp. (677) #14 psychosocial.mp. (3189) #15 belief\$.mp. (2123) #16 subjective norm.mp. (10) #17 social norm.mp. (5) #18 perceived behavioral control.mp. (20) #19 1 or 2 or 3 or 4 or 5 or 6 or 7 (18158) #20 8 or 9 or 10 or 11 (584) #21 12 or 13 or 14 or 15 or 17 or 18 (15608) #22 19 and 20 and 21 (0)

Inclusion and exclusion criteria: To ensure that the research within this systematic review is of the highest quality within the field of investigation, only peer reviewed research was included for the inclusion within this paper, theses, editorials, reviews, published letters, conferences, poster campaigns and books were excluded. Quantitative studies that were published in English, with no restrictions being placed on the date of publication due to the limited amount of available papers. Studies that used the same data set from the same population were not considered within this review, this was to avoid the potential of the findings contributing to positive or negative resulting and invariably biasing the outcome of the review. Only the male adolescent with a cut off age of 20 who were non-competitive recreational gym users were included in this review⁵⁰. Studies were required to provide some information on psychosocial factors (e.g., attitudes, intention, beliefs, social influence and peer pressure) towards using steroids, and overcoming barriers to obtaining steroids (e.g., acquiring the drug from a supplier) and seeking advice about the correct use of the drug.

Case studies quality assessment: The CASP appraisal tool will be used for this process (Ciliska, Thomas and Buffett, 2008).

Data to be extracted: Authors; Date; Country of Study; Groups defined (e.g., Non-steroid-users VS steroid-users); Comparing different age categories; Demographics described; Sample Representativeness; Blinding; Inclusion and exclusion criteria; Standardised measures; Other sources of potential biases; Summary points and key findings; Statistical Tests Used; Age range of Sample; Sample size; Attitude: (belief, motivation, knowledge of risks associated with steroids-use); Subjective norm: (social pressures/ influences and support to use or not to use steroids); Perceived-behavioural-control: (power to obtain, overcome barriers and ease or difficulty to use steroids).

⁵⁰ No limits regarding age were applied to the search strategy to ensure that mixed adolescent and adult studies were not excluded. However, to be included these mixed age studies needed to provide separate data for adults and below the age of 20.

Appendix B: Copies of REC Approval Emails for Phase One and Phase Two

Phase One

From: Aidan Hart
Sent: 03 October 2013 10:11
To: Harry Ager (12354164)
Subject RE: Ethics

Dear Harry,
Please see below for the comments of the two reviewers from your recent ethics application. I was the one of the reviewers, so if you have any queries then please get in touch. These are minor comments and changes and hopefully should not take too much time, but do get in touch if you need to

1st reviewer:

1. It is not the place of the applicant to apply for chairs action. They must simply submit the phase 2 questionnaire to the committee. The decision on chairs action is to be made by the chair at the time of submission. Simply change the form to indicate that the 2nd Q will be submitted to ethics
2. More information is required on the recruitment of participants. The section on recruitment mentions advertising on website and having the interested parties contact the researcher. However, the flowchart in appendix F makes mention of the researcher directly contacting participants. This discrepancy needs to be resolved and more information of how this will be done is required.
3. The EA2 not signed by director of studies (Course research Tutor)
4. It would be useful to have the contact details of the chair of the ethics board on the debrief form.

2nd reviewer:

1. Note that Harry indicates he will seek chairs action to approve questionnaire to be used in phase 2 (closed questions – questionnaire), after phase 1 (open questions – questionnaire). – Suggested that further approval is not necessary.
2. EA2 not signed by director of studies.
3. Recruitment – not clear how opportunity sampling will take place, flow chart suggests this will be in person. Details and risk assessment of this needed.
4. Add details of chair of School of Psychology Ethics Committee to the debrief for participants to be able to make contact if they have any issues relating to the ethics of this research.
5. Ensure replace blanks on info sheet etc with relevant details for this study.

Best wishes

Aidan
Dr. Aidan Hart CPsychol (Clinical/Forensic)
HCPC Registered Clinical and Forensic Psychologist
Academic Tutor
Trent Doctoral Programme in Clinical Psychology
University of Lincoln
Lincoln LN6 7TS
01522 886029

From: Harry Ager (12354164)
Sent: 07 October 2013 11:06
To: Aidan Hart
Subject: RE: Ethics

Hi Aidan,
I hope you're well, just a quick question regarding the ethics form.

Firstly, who is the chair of School of Psychology Ethics Committee?
Secondly regarding recruitment, as I will also be using opportunity sampling (in person), there is mention of a risk assessment to be included. For this point can I state in the form that: "The researcher will make contact with participants who are already known to him, who may then recommend others to participate in the study. Therefore, the likelihood and potential impact of risk for the researcher is deemed as low"?

Best Wishes,
Harry Ager
Trainee Clinical Psychologist,
Trent Doctorate in Clinical Psychology

From: Aidan Hart
Sent: 10 October 2013 09:24
To: Harry Ager (12354164)
Subject: Ethics

Hi Harry,
The chair of the research ethics committee is Patrick Bourke, he is based here in Bridge House

Dr Patrick Bourke,
Senior Lecturer
School of Psychology
University of Lincoln
LN6 7TS
01522 886180

Extra sampling bit is fine. I would consider adding another consideration. Is there a risk that when using opportunity sampling and samples of convenience that potential participants might feel coerced or obligated to take part? If not, why not and if so how will it be managed. A line or two should suffice
Hope that helps. Grab me today if you need to see me

Best wishes
Aidan

From: Aidan Hart
Sent: 11 October 2013 13:55
To: Harry Ager (12354164)
Subject: Ethics

Dear Harry,

I have reviewed the changes to your ethics application/EA2 form and I am pleased to inform you that the changes are acceptable.
You now have clearance to proceed with study as described.
The one main caveat as previously discussed will be that any further amendments along with the questionnaire for stage 2 of the study are resubmitted to the ethics committee at the appropriate time.
Please keep this email for your records as confirmation of ethics approval
If you have any further queries, please do not hesitate to get in touch.

Best wishes
Aidan
Dr. Aidan Hart CPsychol (Clinical/Forensic)
HCPC Registered Clinical and Forensic Psychologist
Academic Tutor
Trent Doctoral Programme in Clinical Psychology
University of Lincoln

Lincoln LN6 7TS
01522 886029

From: Harry Ager (12354164)
Sent: 15 November 2013 20:14
To: Aidan Hart; pBourke@01.lincoln.ac.uk
Subject: Ethics

Hi Aidan and Patrick

I've attached the latest version of my questionnaire for my pilot study after making minor changes to the wording of some of the questions - these have been highlighted in blue.

Best Wishes,
Harry Ager
Trainee Clinical Psychologist,
Trent Doctorate in Clinical Psychology

From: Aidan Hart
Sent: 25 November 2013 17:06
To: Harry Ager (12354164); Patrick Bourke
Subject: Ethics

Dear Harry,

Thank you for your email and new questionnaire. I am happy with it and do not have any amendments that I require

Best wishes
Aidan

From: Patrick Bourke
Sent: 28 November 2013 12:34
To: Aidan Hart; Harry Ager (12354164)
Subject: Research, minor amendments to questionnaire

Dear Harry,
At our meeting yesterday the School of Psychology approved your study.

Best wishes,
Patrick Bourke
Chair Soprec,
School of Psychology,
University of Lincoln

Phase Two

From: Harry Ager (12354164)
Sent: 13 March 2014 18:00
To: Aidan Hart
Subject: RE: Research

Hi Aidan

I hope all is well with you,
Just a couple of quick questions so I can crack on with my research,
When is the next research committee meeting?
Also, can I forward you my updated EA2 application form, as it is a follow up to my pilot study,

which was previously approved and it includes all the appendices and the questionnaire that I have developed?

Thanks for your time!
Best wishes,
Harry Ager
Trainee Clinical Psychologist,
Trent Doctorate in Clinical Psychology

From: Aidan Hart
Sent: 14 March 2014 09:39
To: Harry Ager (12354164)
Subject: Ethics

Hi Harry,

The committee meets on the last Wed of the month. It would be useful to send me any amendments and I will see as soon as possible. I will see if we can get it through on chairs action before that.

Best wishes
Aidan

From: Harry Ager (12354164)
Sent: 24 March 2014 13:08
To: Aidan Hart
Subject: RE: Research

Hi Aidan,

I hope all is well with you.

Please find attached a copy of my EA2 application form, which is the follow up study from my previously approved pilot study. I've also attached a copy of our signatures.

Best Wishes,
Harry Ager
Trainee Clinical Psychologist,
Trent Doctorate in Clinical Psychology

From: Aidan Hart
Sent: 31 March 2014 10:15
To: Harry Ager (12354164)
CC: Roshan Nair (Roshan.Nair@nottingham.ac.uk)
Subject: Ethics

Dear Harry,

Thank you for your email of the 24.03.2014 and the attached EA2 form.
We have reviewed the proposal and I am happy to inform you that ethical approval has been granted and you are free to proceed with the research as described.
Your approval code is 240314-HA

With best wishes
Aidan
Dr. Aidan Hart CPsychol (Clinical/Forensic)
HCPC Registered Clinical and Forensic Psychologist
Senior Lecturer in Psychology
University of Lincoln
Lincoln LN6 7TS

From: Aidan Hart
Sent: 02 May 2014 11:46
To: Harry Ager (12354164)
CC: Zoe Mead
Subject: Ethics

Dear Harry,

Thank you for submitting your amended questionnaire to the ethics panel for consideration by chairs action. We have reviewed the changes and are happy to inform you that the amendments have now been approved by chairs action and you are free to proceed with the study.

If you need a reference and or evidence if this decision please use this email as proof and the reference HA02052014

Please let me know if I can be of any more assistance

Best wishes
Aidan
Dr Aidan Hart
Senior lecturer in Psychology
University of Lincoln

From: Harry Ager (12354164)
Sent: Aidan Hart
To: 27 July 2014 13:34
Subject: Ethics

Hi Aidan,

In addition to my previous email (Online recruitment with non-steroid-users), I'm currently recruiting via Addaction (**Via a paper version of the forms**). Therefore, I've made some minor changes to the forms.

- (1) the TPB questionnaire has some boxes for participants to put their personal identifiers at the top right of the form.
- (2) within the the information sheet, I have removed the statement "your details cannot be connected to your questionnaire responses".
- (3) I've included a separate form (prize draw) for participants to include their email address to be entered into this.
- (4) I have removed a section asking for their name.

Thanks for your time,

Best wishes,
Harry Ager
Trainee Clinical Psychologist,
Trent Doctorate in Clinical Psychology

From: Aidan Hart
Sent: Harry Ager (12354164)
To: 28 July 2014 12:01
CC: Zoe Mead
Subject: Ethics

Dear Harry,

Thank you for your emails of the 22.07.2014 and 27.07.2014 outlining changes to your research ethics application. The two proposed changes are the you will

- a) Be recruiting non-steroid users
- b) Approaching further steroid users via the AddAction drug abuse service using paper questionnaires.

I have reviewed the changes and I am happy that they conform to the requirements of the ethics committee. I am therefore happy to both view these as minor modifications that do not require a full reappraisal and to also grant approval.

Please be aware that approval is contingent upon all the appropriate permissions being received from Addaction and their policies being followed. Please keep copies of all permissions either paper or email, as we may ask to see them at a later date.

Therefore, approval is granted. Your ethics committee code for this approval is **HA28072014**

Best wishes

Aidan

Appendix C: Copy of R&D Approval Email from Addaction

From: Craig Moss [c.moss@addaction.org.uk]
Sent: 14 April 2014 10:24
To: Harry Ager (12354164)
Cc: Nicky Dewhirst-vickers
Subject: RE: Addaction research

Hi Harry

Sorry for the delay in getting back to you!

I am actually on annual leave this week and am tying up a few last ends before heading off tomorrow. Any chance you could send me through your final questionnaire and proposal please?

Our ethics committee made a 'favourable with conditions' decision, so I should be able to check everything is in order and give you authorisation to go ahead once I've reviewed your final materials.

I look forward to hearing from you.

Many thanks
Craig
Craig Moss
Research Manager
Mobile: 077 342 77 051
Research and Development (myaddaction)
Addaction Central Office
67-69 Cowcross Street
Smithfield
London EC1M 6PU

From: Craig Moss [c.moss@addaction.org.uk]
Sent: 29 April 2014 09:21
To: Harry Ager (12354164)
Cc: Nicky Dewhirst-vickers
Subject: RE: Addaction research

Morning

Looks great Harry. Thanks for sending it through.

Yes it would be good to meet. I'm happy to come to Lincoln. Any dates good with you Harry? Nicky, do you have any free time to meet up with me and Harry, or is there someone more appropriate to meet up with?

Thanks Craig
Craig Moss
Research Manager
Mobile: 077 342 77 051
Research and Development (myaddaction)
Addaction Central Office
67-69 Cowcross Street
Smithfield
London EC1M 6PU

Appendix D: Phase One: Participant Information Sheet for Steroid-users

Examining psychosocial factors associated with adult male anabolic androgenic steroid use among gym users

Name of Researcher(s): Harry Ager

Primary Study Statistician: Nima Moghaddam

Secondary Study Statistician: Roshan Nair

We would like to invite you to take part in our research study. Before you decide whether you would like to be involved, we would like you to understand why the research is being done and what it would involve for you. Please take time to read the following information carefully and discuss it with others if you wish. Please ask us if there is anything that is not clear or if you would like more information.

Thank you for reading this information sheet.

What is the purpose of the study?

This study aims to explore first-hand experiences of steroid-users' attitudes and knowledge about the related side-effects towards using steroids. It will explore their motivation for using steroids and whether and how societal pressures and barriers influence their decision to use steroids.

The findings from the study will be included in a Clinical Psychology Doctorate dissertation and will be used to develop a questionnaire to predict anabolic androgenic steroids use, and may be used to create a harm minimization-programme and intervention.

Why have I been invited?

We are initially looking for 25 male participants who are over the age of 18 and who currently use steroids. You will need to be able to read and write in English to be eligible to take part in this study.

Do I have to take part?

It is up to you to decide whether or not to take part. If you do decide to take part you will be given this information sheet to keep and be asked to select a tick-box in line with BPS ethical standards for online research to obtain your consent. If you decide to take part you are still free to withdraw at any time and without giving a reason.

What will happen to me if I take part?

If you agree to take part, you could complete an online questionnaire. It will take between 10-15 minutes to complete.

You are free to refuse to answer any question without giving an explanation. You will also be asked whether the researcher can keep your contact details if you indicate that you would like to a copy of the report summary upon completion of the research study in November 2014. You will be able to ask questions related to the study before and after the completion of the questionnaire by contacting the researcher, their contact details are given at the end of this information sheet.

At a later date, only five participants are required to participate in the revision of the questionnaire (e.g., regarding the details about the questionnaire, the wording of questions, clarity, lengthiness and completing additional questions). Once again this will follow the same process to the one above. Please indicate whether you would like to be considered for this on the consent form.

Prize draw

You can also choose to enter into a separate survey prize draw to win one of two £50 Amazon vouchers. Just enter your preferred contact details below for the prize draw (e.g. email address) - your details cannot be connected to your questionnaire responses.

What are the possible disadvantages and risks of taking part?

Firstly, being part of this research will involve you giving up your time to complete this questionnaire. As some of the questions ask about sensitive issues you may find it difficult to think about these issues. You do not have to disclose anything you do not wish to. If you did require some additional support we have provided contact details for some support services at the end of this information sheet.

What are the possible benefits of taking part?

Taking part will give you an opportunity to think about your use of steroids, without judgement. Also, you will be making a valuable contribution to the understanding of steroid use, which might benefit others.

What if there is a problem?

If you have a concern about any aspect of this study, you should ask to speak to the researchers who will do their best to answer your questions.

Will my taking part in the study be kept confidential?

Yes. All information collected about you during the course of the research will be kept strictly confidential. You will not be asked to supply your name, address or any identifiable information. You will be assigned a participant numerical code number, a pseudonym and the first four digits of your DOB will be used at the time of consent to maintain confidentiality/anonymity of the data. For example, Henry Agger will be converted to "001_HA_1610". All of your data and transcripts will be securely stored at the University of Lincoln on a password protected computer-file only accessible by the researcher and research supervisors. It will be stored for seven years in accordance with the University of Lincoln storage Policy.

However, if the researcher has any concerns for your or other people's safety, then this information would be shared with the appropriate third party agencies so it can be managed appropriately. If the researcher intended to share information they would usually discuss this with you first.

What will happen if I don't want to carry on with the study?

Your participation is voluntary and you are free to withdraw at any time, without giving any reason. You may also contact Harry Ager two weeks after completing the questionnaire if you decide to withdraw your data from the study. However, after this time period the information collected so far cannot be erased as it will be transcribed in preparation to be used in the project analysis.

What will happen to the results of the research study?

The results of the study will be written up into a report that will be assessed by The University of Lincoln in November 2014 as part of the Trent Doctorate in Clinical Psychology (DClinPsy). The research will be submitted for publication in a journal. You will not be identified in any presentation of the data. If you would like a summary of the

study findings, please indicate this on the consent form and you will be sent a copy via email in November 2014.

Who has reviewed the study?

All research is looked at by independent group of people, called a Research Ethics Committee, at the University of Lincoln to protect your interests. This study has been reviewed and given favourable opinion by the University of Lincoln's Research Ethics Committee.

Thank you for reading this information sheet. If you would like to take part in this study please contact Harry Ager via the email address provided at the end of the information sheet.

Further information and contact details:

Harry Ager, Email Address: 12354164@students.lincoln.ac.uk

Supervised by:

Dr Nima Moghaddam, Research Tutor, Email Address:

NMoghaddam@post01.lincoln.ac.uk

Dr Roshan Nair, Research Tutor, Email Address: Roshan.Nair@nottingham.ac.uk

Doctorate in Clinical Psychology
University of Lincoln
Faculty of Health, Life and Social Sciences
1st Floor, Bridge House
Brayford Pool,
Lincoln,
LN6 7TS

Support services and Helplines:

Anabolic Steroids, DAN 24/7 helpline,
Freephone 0808 808 2234 or text DAN to 81066.
You can talk confidentially to an advisor.

Appendix E: Phase One and Two Online Consent

Examining psychosocial factors associated with adult male anabolic androgenic steroid use among gym users

Name of Researcher: Harry Ager

1. I confirm that I have read and understand the information sheet for the above study and have had the opportunity to ask questions.
2. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason. I understand that should I withdraw two weeks after the completion of the questionnaire I can request for the information collected to be erased. However, after this time period the information cannot be erased as it would have been transcribed to be used in the project analysis.
3. I give permission for the researcher and research supervisors to collect, store, analyse and publish information obtained from my participation in this study. I understand that my personal details will be kept confidential.
4. I understand that all the information from the questionnaire will be made anonymous and may be used in the study reports/publications.

In order to process you must tick the box to confirm that you wish to take part in this study and confirm that you agree to all of the above statements.

Yes

No

If you would like a summary of the findings, please provide an email address in the box below.

Please enter a pseudonym and the first four digits of your DOB for your non-identifiable personal code (e.g., "HA 1610").

Optional: I would also like to be part of the final revision of the questionnaire⁵¹.

Yes

No

⁵¹ Note. This question was only visible during the pilot study.

Appendix F: Phase One: Email and Website Recruitment Message

Forwarding Message to Bodybuilding Forums

Dear

My name is Harry Ager and I am a Trainee Clinical Psychologist at the University of Nottingham and Lincoln. I am now looking for participants for my research study. This is open to male participants who are over the age of 18 and who currently use steroids and who have access to a computer with internet.

This study aims to examine steroid-users' attitudes towards steroid-use and whether and how societal pressures and barriers influence their decision to use steroids. It will also explore their knowledge about the related side-effects towards using steroids.

Would it be possible to advertise this information on your forum?

Many thanks,

Harry Ager

Message to participants

Would you be interested in taking part in a study?

This study aims to examine steroid-users' attitudes towards steroid-use and whether and how societal pressures and barriers influence their decision to use steroids. It will also explore their knowledge about the related side-effects towards using steroids.

My name is Harry Ager and I am a Trainee Clinical Psychologist at the University of Nottingham and Lincoln. The study involves answering a questionnaire and your answers will be confidential and anonymous. It will take no longer than 10 minutes to complete.

This is currently an area of the steroid literature which is yet to be explored and will make a valuable contribution to research.

You can also choose to enter into a separate survey prize draw to win one of two £50 Amazon vouchers. Just enter your preferred contact details for the prize draw (e.g. email address) - your details cannot be connected to your questionnaire responses.

If you are interested in taking part in this study then please click on the link below:

<http://edu.surveymzmo.com>

Please feel free to contact me if you have any questions.

If you have any issues relating to the ethics of this research you can contact the chair of the School of Psychology Ethics Committee:

Dr Patrick Bourke,
Senior Lecturer
School of Psychology
University of Lincoln
LN6 7TS
01522 886180

Best wishes,
Harry Ager
Email Address: 12354164@students.lincoln.ac.uk

Supervised by:

Dr Nima Moghaddam, Research Tutor, Email Address:

NMoghaddam@post01.lincoln.ac.uk

Dr Roshan Nair, Research Tutor, Email Address: Roshan.Nair@nottingham.ac.uk

Appendix G: Phase One: Pilot/Elicitation Survey

Examining psychosocial factors associated with adult male anabolic androgenic steroid use among gym users

What is your age?.....

Please Select, the ethnicity that best describes you

White

White British

White Irish

Other white

Mixed

White and Black Caribbean

White and Black African

White and Asian

Any other Mixed

Asian or Asian British

Indian

Pakistani

Bangladeshi

Any other Asian

Black or Black British

Caribbean

African

Any other Black

Chinese or other ethnic group

Chinese

Any other ethnic group

Please Select the highest level of education you have completed

No formal qualifications

GCSEs (previously O Levels)

(NVQ Level 1,2,3)

A Levels

Higher education qualification below degree level, (e.g., diploma)

Bachelor's degree (e.g., BSc) or professional equivalent

Master's degree or professional equivalent

Doctoral degree

Please Select your current employment status

Employed for wages

Self-employed

Out of work and looking for work

Out of work but not currently looking for work

A student

Retired

Unable to work

Please Select your annual income

<£19,999

£20,000-£29,999

£30,000-£39,999

£40,000-£49,999+

Please Select your marital status

Single, never married

Married, civil partnership or domestic partnership

Widowed

Divorced

Separated

Other (please specify).....

How old were you when first used

.....

steroids?

Please Select which steroids you normally use/prefer?

Testosterones
Dianabol
Anadrol
Deca-Durabolin
Winstrol
Anavar
Equipoise
Durabolin
Other (please specify).....

Please Select if you use:

Tablets
Jabs/injections
Both

Please Select how many times you have used steroids?

1 time
Between 2-10 times
More than 10 times

How many weeks do you stay "on" steroids per course/cycle?

.....

How many weeks do you take "off" steroids between a course/cycle?

.....

How often do you use steroids a year?

.....

Have you ever used more than one steroid per cycle (i.e. stacking)?

Yes
No

Please give an example of your typical course/stack:

.....
.....
.....

Please describe your heaviest course/stack you have ever used:

.....
.....
.....

How often do you attend the gym (e.g., 3 times a week)?

.....

Length of time you spend at the gym per session (e.g., 45 minutes)?

.....

Please Select if you consider yourself to be,

Recreational exerciser
Competitive bodybuilder
Competitive weightlifter
Competitive athlete
Other (please specify).....

Do you drink alcohol?

Yes/No

Do you smoke tobacco?

Yes/No

Do you use recreational drugs? (e.g., cannabis, cocaine)

Yes/No

If yes, please state the most common recreational drug that you use,

.....

1. What do you believe are the advantages of using steroids?
.....
2. What do you believe are the disadvantages of using steroids?
.....
3. What else comes to mind when you think about using steroids?
.....
4. Please list the individuals or groups who would approve or think you should use steroids?
.....
5. Please list the individuals or groups who would disapprove or think you should not use steroids?
.....
6. What else comes to mind when you think about other people's views about your use of steroids?
.....
7. Please list any factors or circumstances that would make it easy or enable you to use steroids?
.....
8. Please list any factors or circumstances that would make it difficult or prevent you from using steroids?
.....
9. Are there any other issues that come to mind when you think about using steroids?
.....
10. Why did you start to use steroids?
.....
11. Why do you currently use steroids?
.....
12. Where did you learn about steroids (e.g., friends)?
.....
13. Do you think there any health issues related to steroid use? If so, what are they?
.....
14. What do you think about your body and the way you look?
.....
15. How do you feel about your body?
.....
16. Have you noticed any changes in the way you feel and behave since you have been using steroids? If so, please describe these changes:
.....
17. How has your lifestyle or quality of life changed since you have been using steroids?
.....
18. Has anyone passed any comments about your physical appearance since you started using steroids? If so, what have they said?
.....
19. Has anyone noticed any changes in you since you started using steroids? If so, what have they noticed?
.....
20. Do you have anything else to say about your steroid use that is not covered by this questionnaire?
.....

Appendix H: Phase One and Two: Debrief Page for Participants

Thank you for taking the time to participate in this study. Your views are extremely important to us and will help to further our understanding of the (non⁵²) steroid user. Your responses are completely anonymous and confidential.

If any aspects of this study have raised any questions or concerns for you and you need somebody to talk to, we have provided details of the researcher and links to further sources of support below.

If you have indicated your interest on the consent form you will be provided with a summary of the research findings and you will be contacted via email when they are released.

If you have any issues relating to the ethics of this research you can contact the chair of the School of Psychology Ethics Committee:

Dr Patrick Bourke,
Senior Lecturer
School of Psychology
University of Lincoln
LN6 7TS
01522 886180

Best wishes,

Harry Ager

Email Address: 12354164@students.lincoln.ac.uk

Supervised by:

Dr Nima Moghaddam, Research Tutor, Email Address:

NMoghaddam@post01.lincoln.ac.uk

Dr Roshan Nair, Research Tutor, Email Address: Roshan.Nair@nottingham.ac.uk

⁵² Note. The word 'non' was included within the debriefing form for non-steroid-users only.

Appendix I: Phase Two: Email and Website Recruitment Message

Forwarding Message to Bodybuilding Forums

Dear

My name is Harry Ager and I am a Trainee Clinical Psychologist at the University of Nottingham and Lincoln. I am now looking for participants for my research study. This is open to male participants who are over the age of 18 and who (DO NOT⁵³) currently use steroids and who have access to a computer with internet.

This study aims to examine (non) steroid-users' attitudes towards steroid-use and whether and how societal pressures and barriers influence their decision to (not) use steroids. It will also explore their knowledge about the related side-effects towards using steroids.

Would it be possible to advertise this information on your forum?

Many thanks,

Harry Ager

Message to participants

Would you be interested in taking part in a study?

This study aims to examine (non) steroid-users' attitudes towards steroid-use and whether and how societal pressures and barriers influence their decision to (not) use steroids. It will also explore their knowledge about the related side-effects towards using steroids.

My name is Harry Ager and I am a Trainee Clinical Psychologist at the University of Nottingham and Lincoln. The study involves answering a questionnaire and your answers will be confidential and anonymous. It will take no longer than 10 minutes to complete.

This is currently an area of the steroid literature which is yet to be explored and will make a valuable contribution to research.

⁵³ Note. for the brevity of this submission, information presented in brackets and highlighted was not included in the version designed for steroid-users, but was included in a separate form for non-steroid-users.

You can also choose to enter into a separate survey prize draw to win one of two £50 Amazon vouchers. Just enter your preferred contact details for the prize draw (e.g. email address) - your details cannot be connected to your questionnaire responses.

If you are interested in taking part in this study then please click on the link below:

<http://edu.surveymoz.com>

Please feel free to contact me if you have any questions.

If you have any issues relating to the ethics of this research you can contact the chair of the School of Psychology Ethics Committee:

Dr Patrick Bourke,
Senior Lecturer
School of Psychology
University of Lincoln
LN6 7TS
01522 886180

Best wishes,
Harry Ager
Email Address: 12354164@students.lincoln.ac.uk

Supervised by:

Dr Nima Moghaddam, Research Tutor, Email Address:

NMoghaddam@post01.lincoln.ac.uk

Dr Roshan Nair, Research Tutor, Email Address: Roshan.Nair@nottingham.ac.uk

Appendix J:

Phase Two: Survey for Steroid-users



Put ID here:

--	--	--	--	--	--	--	--



The University of
Nottingham

Questionnaire

(Version 1.1: 22.07.14)

Title of Study: "Examining psychosocial factors associated with adult male anabolic androgenic steroid use among gym users"

Section 1

A What is your age?.....

B Please circle⁵⁴, the ethnicity that best describes you:

White

White British
White Irish
Other white

Mixed

White and Black Caribbean
White and Black African
White and Asian
Any other Mixed

Asian or Asian British

Indian
Pakistani
Bangladeshi
Any other Asian

Black or Black British

Caribbean
African
Any other Black

Chinese or other ethnic group

Chinese
Any other ethnic group

C Please circle, the highest level of education you have completed:

No formal qualifications	-	Less than a High School Diploma
GCSEs (previously O Levels)	14-16	-
A-Levels, AS-Levels, NVQs, Diplomas	16-18	High School Graduate
Higher Education at University, Technical College	18+	University, Technical College or Community College

⁵⁴ *Note.* This was changed to 'select' for the online version of the questionnaire. Furthermore, the ID at the top right of this questionnaire was only available for the paper copy.

- D** How many years have you spent in full time education?
- E** Please circle, your current employment status:
- Employed for wages
 - Self-employed
 - Out of work and looking for work
 - Out of work but not currently looking for work
 - A student
 - Retired
 - Unable to work
- F** What is your occupation?
- G** Please circle, your marital status:
- Single, never married
 - Married, civil partnership or domestic partnership
 - Widowed
 - Divorced
 - Separated
 - Other (please specify).....
- H** There are a number of negative side effects of using steroids. What do you think are the 5 most important side effects of steroids?
.....
.....
.....
- I** How old were you when you first used steroids?
- J** Please circle which steroids you normally use/prefer?
- Anadrol
 - Anavar
 - Clenbuterol
 - Deca-Durabolin
 - Dianabol
 - Equipoise
 - Halotestin
 - Human Growth Hormone
 - Masteron
 - Primobolan
 - Primoteston
 - Sustanon
 - Testosterone Cypionate
 - Testosterone Enanthate
 - Testosterone Propionate
 - Testoviron
 - Trenbolone
 - Winstrol
 - Other (please specify).....
- K** Please circle, if you use:
- Tablets
 - Jabs/injections
 - Both
- L** How many times have you used steroids?

- M** Please circle, how many weeks do you stay "on" steroids per course/cycle? 6-12 weeks
12-16 weeks
16-20 weeks
Other (please specify).....
- N** Please circle, how many weeks do you take "off" steroids between a course/cycle? 0-6 weeks
6-12 weeks
12-18 weeks
18-24 weeks
24-30 weeks
30-36 weeks
36-42 weeks
42-48 weeks
48-52 weeks
Other (please specify).....
- O** How often do you use steroids **a year** (e.g., twice a year)?
- P** Please circle, if you have you ever used more than one steroid per cycle (i.e. stacking)? Yes
No
- Q** How often do you attend the gym (e.g., 3 times a week)?
- R** Please circle, the length of time you spend at the gym per session? 0-30 minutes
30-45 minutes
45-60 minutes
60-90 minutes
90 minutes +
- S** Please circle which of the following you most consider yourself to be: Recreational exerciser
Competitive bodybuilder
Competitive weightlifter
Competitive athlete
Personal trainer
Other (please specify).....
- T** Do you drink alcohol? Yes/No
- U** Do you smoke tobacco? Yes/No
- V** Do you use recreational drugs? (e.g., cannabis, cocaine) Yes/No
- If yes, please state the most common recreational drug that you use:

Section 2

Instructions

Please circle the number below that best describes your opinion to each statement.

- | | | |
|----|--|--|
| 1 | If I use steroids, I will build up my muscles more quickly | Unlikely 1 2 3 4 5 6 7 Likely |
| 2 | If I use steroids, I will enhance my recovery time (e.g., reduce injury) | Unlikely 1 2 3 4 5 6 7 Likely |
| 3 | If I use steroids, I will increase my strength | Unlikely 1 2 3 4 5 6 7 Likely |
| 4 | If I use steroids, I will improve my physical appearance | Unlikely 1 2 3 4 5 6 7 Likely |
| 5 | If I use steroids, I will enhance my potential/training ability (e.g., push beyond plateau) | Unlikely 1 2 3 4 5 6 7 Likely |
| 6 | If I use steroids, my mood will improve | Unlikely 1 2 3 4 5 6 7 Likely |
| 7 | If I use steroids, I will improve my competitive performance | Unlikely 1 2 3 4 5 6 7 Likely |
| 8 | If I use steroids, they will cause me visible/physical side effects (e.g., testicles shrinking, skin problems) | Unlikely 1 2 3 4 5 6 7 Likely |
| 9 | If I use steroids, they will cause me internal side effects (e.g., organ damage, risk of infection) | Unlikely 1 2 3 4 5 6 7 Likely |
| 10 | If I use steroids, my mood will be negatively affected (e.g., increased anger, mood swings) | Unlikely 1 2 3 4 5 6 7 Likely |
| 11 | If I use steroids, I will become dependent on them | Unlikely 1 2 3 4 5 6 7 Likely |
| 12 | Steroids will be made legal | Unlikely 1 2 3 4 5 6 7 Likely |
| 13 | Steroids will be accessible over the counter | Unlikely 1 2 3 4 5 6 7 Likely |
| 14 | I will be able to identify a reliable supplier | Unlikely 1 2 3 4 5 6 7 Likely |
| 15 | I will have enough money to buy steroids | Unlikely 1 2 3 4 5 6 7 Likely |
| 16 | I can be certain about the quality of supplied steroids | Unlikely 1 2 3 4 5 6 7 Likely |
| 17 | Building up my muscles more quickly is | Extremely undesirable -3 -2 -1 0 1 2 3 Extremely desirable |
| 18 | Enhancing my recovery time (e.g., reducing injury) is | Extremely undesirable -3 -2 -1 0 1 2 3 Extremely desirable |

19	Increasing my strength is	Extremely undesirable	-3 -2 -1 0 1 2 3	Extremely desirable
20	Improving my physical appearance is	Extremely undesirable	-3 -2 -1 0 1 2 3	Extremely desirable
21	Enhancing my potential/training ability (e.g., push beyond plateau) is	Extremely undesirable	-3 -2 -1 0 1 2 3	Extremely desirable
22	Improving my mood is	Extremely undesirable	-3 -2 -1 0 1 2 3	Extremely desirable
23	Improving my competitive performance is	Extremely undesirable	-3 -2 -1 0 1 2 3	Extremely desirable
24	Experiencing visible/physical side effects (e.g., testicles shrinking, skin problems) is	Extremely undesirable	-3 -2 -1 0 1 2 3	Extremely desirable
25	Experiencing internal side effects (e.g., organ damage, risk of infection) is	Extremely undesirable	-3 -2 -1 0 1 2 3	Extremely desirable
26	Experiencing negative mood (e.g., increased anger, mood swings) is	Extremely undesirable	-3 -2 -1 0 1 2 3	Extremely desirable
27	Becoming dependent is	Extremely undesirable	-3 -2 -1 0 1 2 3	Extremely desirable
28	Most other people (e.g., non-users and wider society) would	disapprove	-3 -2 -1 0 1 2 3	approve of my steroid use
29	My family would	disapprove	-3 -2 -1 0 1 2 3	approve of my steroid use
30	Other bodybuilders and gym-users	do not	-3 -2 -1 0 1 2 3	do use steroids
31	Medics think I	should not	-3 -2 -1 0 1 2 3	should use steroids
32	My friends would	disapprove	-3 -2 -1 0 1 2 3	approve of my steroid use
33	My partner (e.g., girlfriend/boyfriend) would	disapprove	-3 -2 -1 0 1 2 3	approve of my steroid use
34	Athletes and coaches think I	should not	-3 -2 -1 0 1 2 3	should use steroids
35	Work colleagues and my employer would	disapprove	-3 -2 -1 0 1 2 3	approve of my steroid use
36	For me, using steroids would be	Harmful	1 2 3 4 5 6 7	Beneficial
37	For me, using steroids would be	Good	1 2 3 4 5 6 7	Bad
38	For me, using steroids would be	Enjoyable	1 2 3 4 5 6 7	Unenjoyable
39	For me, using steroids would be	The wrong thing to do	1 2 3 4 5 6 7	The right thing to do

40	What most other people (e.g., non-users and wider society) think I should do matters to me	Not at all	1 2 3 4 5 6 7	Very much
41	What my family think I should do matters to me	Not at all	1 2 3 4 5 6 7	Very much
42	Doing what other bodybuilders and gym-users do is important to me	Not at all	1 2 3 4 5 6 7	Very much
43	Medics' approval of what I do is important to me	Not at all	1 2 3 4 5 6 7	Very much
44	What my friends would think I should do matters to me	Not at all	1 2 3 4 5 6 7	Very much
45	What my partner (e.g., girlfriend/boyfriend) thinks I should do matters to me	Not at all	1 2 3 4 5 6 7	Very much
46	Athletes' and coaches' approval of what I do is important to me	Not at all	1 2 3 4 5 6 7	Very much
47	What work colleagues and my employer think I should do matters to me	Not at all	1 2 3 4 5 6 7	Very much
48	If steroids were legal, it would make it	much more difficult	-3 -2 -1 0 1 2 3	much easier to use them
49	The accessibility of steroids over the counter makes it	much more difficult	-3 -2 -1 0 1 2 3	much easier to use them
50	If I know a reliable supplier, I am	less likely	-3 -2 -1 0 1 2 3	more likely to use them
51	Having no money makes it	much more difficult	-3 -2 -1 0 1 2 3	much easier to use them
52	If I am uncertain about the quality of the steroid, I am	less likely	-3 -2 -1 0 1 2 3	more likely to use them
53	Most people who are important to me think that I should	1 2 3 4 5 6 7	should not use steroids	
54	I intend to use steroids in the next six months	Strongly disagree	1 2 3 4 5 6 7	Strongly agree
55	It is expected of me that I use steroids	Strongly disagree	1 2 3 4 5 6 7	Strongly agree
56	I am confident that I could use steroids if I wanted to	Strongly disagree	1 2 3 4 5 6 7	Strongly agree
57	For me to use steroids is	Easy	1 2 3 4 5 6 7	Difficult
58	I plan to use steroids in the next six months	Strongly disagree	1 2 3 4 5 6 7	Strongly agree

59	Whether I use steroids is entirely up to me	Strongly disagree	1 2 3 4 5 6 7	Strongly agree
60	The decision to use steroids is beyond my control	Strongly disagree	1 2 3 4 5 6 7	Strongly agree
61	I feel under social pressure to use steroids	Strongly disagree	1 2 3 4 5 6 7	Strongly agree
62	I will use steroids in the next six months	Strongly disagree	1 2 3 4 5 6 7	Strongly agree

Appendix K: Phase Two: Participant Information Sheet for Steroid-users



Participant Information Sheet

(Version 1.1 22.07.14)

Title of Study: Examining psychosocial factors associated with adult male anabolic androgenic steroid use among gym users

Name of Researcher(s): Harry Ager

Primary Study Statistician: Nima Moghaddam

Secondary Study Statistician: Roshan Nair

We would like to invite you to take part in our research study. Before you decide whether you would like to be involved, we would like you to understand why the research is being done and what it would involve for you. Please take time to read the following information carefully and discuss it with others if you wish. Please ask us if there is anything that is not clear or if you would like more information.

Thank you for reading this information sheet.

What is the purpose of the study?

This study aims to examine steroid-users' attitudes towards steroid-use and whether and how societal pressures and barriers influence their decision to use steroids. It will also explore their knowledge about the related side-effects towards using steroids.

For this we have developed a questionnaire asking you about these experiences. The findings from the study will be included in a Clinical Psychology Doctorate dissertation and may be used to create a harm minimization-programme and intervention.

Why have I been invited?

We are looking for 80 male participants for this study who over the age of 18 and who currently use steroids. You will need to be able to read and write in English to be eligible to take part in this study.

Do I have to take part?

It is up to you to decide whether or not to take part. If you do decide to take part you will be given this information sheet to keep and be asked to select a tick-box in line with BPS ethical standards for online research to obtain your consent. Alternatively, completion of the questionnaire is an indication of your informed consent. If you decide to take part you are still free to withdraw at any time and without giving a reason.

What will happen to me if I take part?

If you agree to take part, you will be asked to complete a questionnaire which should not take any longer than 10-15 minutes to complete. You can either complete the questionnaire online or return the questionnaire in a pre-paid envelope to the address as stated on the envelope.

You will also be asked whether the researcher can keep your email address if you indicate that you would like to a copy of the report summary upon completion of the research study in January 2015. You will be able to ask questions related to the study before and after the completion of the questionnaire.

Prize draw

You can also choose to enter into a separate survey prize draw to win one of two £50 Amazon vouchers. Just enter your preferred contact details for the prize draw (e.g. email address). Your details cannot be connected to your questionnaire responses.

What are the possible disadvantages and risks of taking part?

Firstly, being part of this research will involve you giving up your time to complete this questionnaire. As some of the questions ask about sensitive issues you may find it difficult to think about these issues. You do not have to disclose anything you do not wish to. If you did require some additional support we have provided contact details for some support services at the end of this information sheet.

What are the possible benefits of taking part?

Taking part will give you an opportunity to think about your use of steroids, without judgement. Also, you will be making a valuable contribution to the understanding of steroid use, which might benefit others.

What if there is a problem?

If you have a concern about any aspect of this study, you should ask to speak to the researchers who will do their best to answer your questions. The researchers contact details are given at the end of this information sheet.

Will my taking part in the study be kept confidential?

Yes. All information collected about you during the course of the research will be kept strictly confidential. You will not be asked to supply your name, address or any identifiable information. You will be assigned a participant numerical code number, a pseudonym and the first four digits of your DOB will be used at the time of consent to maintain confidentiality/anonymity of the data. For example, Henry Agger will be converted to "001_HA_1610". All of your data and transcripts will be securely stored on a password-protected computer-file only accessible by the researcher and research supervisors. This will be stored in a locked filing cabinet at the University of Lincoln and placed in archive storage for seven years in accordance with the University of Lincoln storage Policy

However, if the researcher has any concerns for your or other people's safety, then this information would be shared with the appropriate third party agencies so it can be managed appropriately. If the researcher intended to share information they would usually discuss this with you first.

What will happen if I don't want to carry on with the study?

Your participation is voluntary and you are free to withdraw at any time, without giving any reason. You may also contact Harry Ager two weeks after completing the questionnaire if you decide to withdraw your data from the study. However, after this time period the information collected so far cannot be erased as it will be transcribed in preparation to be used in the project analysis.

What will happen to the results of the research study?

The results of the study will be written up into a report that will be assessed by The University of Lincoln in January 2015 as part of the Trent Doctorate in Clinical

Psychology (DClinPsy). The research will be submitted for publication in a journal. You will not be identified in any presentation of the data. If you would like a summary of the study findings, please indicate this on the consent form and you will be sent a copy via email in January 2015.

Who has reviewed the study?

All research is looked at by independent group of people, called a Research Ethics Committee, at the University of Lincoln to protect your interests. This study has been reviewed and given favourable opinion by the University of Lincoln's Research Ethics Committee.

Thank you for reading this information sheet. If you would like to take part in this study please contact Harry Ager via the email address provided at the end of the information sheet.

Further information and contact details:

Harry Ager, Email Address: 12354164@students.lincoln.ac.uk

Supervised by:

Dr Nima Moghaddam, Research Tutor, Email Address:

NMoghaddam@post01.lincoln.ac.uk

Dr Roshan Nair, Research Tutor, Email Address: Roshan.Nair@nottingham.ac.uk

Doctorate in Clinical Psychology
University of Lincoln
Faculty of Health, Life and Social Sciences
1st Floor, Bridge House
Brayford Pool,
Lincoln,
LN6 7TS

Support services and Helplines:

Please contact your GP/Physician for more information.

Anabolic Steroids, DAN 24/7 helpline, Freephone 0808 808 2234 or text DAN to 81066.

You can talk confidentially to an advisor (Only available in the UK).

Resource International website: Steroid.com found at: <http://www.steroid.com/>

Appendix L: Copy of Approval Email from the Health Shop

From: WILKINS Louise [Louise.Wilkins@nottshc.nhs.uk]
Sent: 21 February 2013 10:14
To: Harry Ager (12354164)
Subject: RE: Research

Dear Harry,

Laura has spoken to me about your research and I feel that this is something the service can support. If you would like to meet to discuss this please let me know.

Best wishes

Lou

Lou Wilkins
Team Leader - Recovery In Nottingham & The Health Shop

NOTTINGHAMSHIRE HEALTHCARE NHS TRUST
Substance Misuse Services - Specialist Services Directorate

PLEASE NOTE TEMPORARY ADDRESS:
11-13 Heathcote Street
Hockley
Nottingham
NG1 3AF

Direct Line: 0115 845 1341
Email: louise.wilkins@nottshc.nhs.uk

Appendix M: Phase Two: Participant Information Sheet for Non-steroid-users



Participant Information Sheet

(Version 1.1 22.07.14)

Title of Study: Examining psychosocial factors associated with adult male non-anabolic androgenic steroid use among gym users

Name of Researcher(s): Harry Ager

Primary Study Statistician: Nima Moghaddam

Secondary Study Statistician: Roshan Nair

We would like to invite you to take part in our research study. Before you decide whether you would like to be involved, we would like you to understand why the research is being done and what it would involve for you. Please take time to read the following information carefully and discuss it with others if you wish. Please ask us if there is anything that is not clear or if you would like more information.

Thank you for reading this information sheet.

What is the purpose of the study?

This study aims to examine non-steroid-users attitudes towards steroid-use and whether and how societal pressures and barriers influence their decision to not use steroids. It will also explore their knowledge about the related side-effects towards using steroids.

For this we have developed a questionnaire asking you about these experiences. The findings from the study will be included in a Clinical Psychology Doctorate dissertation and may be used to create a harm minimization-programme and intervention.

Why have I been invited?

We are looking for 80 male participants for this study who over the age of 18 and who do not use steroids. You will need to be able to read and write in English to be eligible to take part in this study.

Do I have to take part?

It is up to you to decide whether or not to take part. If you do decide to take part you will be given this information sheet to keep and be asked to select a tick-box in line with BPS ethical standards for online research to obtain your consent. If you decide to take part you are still free to withdraw at any time and without giving a reason.

What will happen to me if I take part?

If you agree to take part, you will be asked to complete a questionnaire which should not take any longer than 10-15 minutes to complete.

You will also be asked whether the researcher can keep your email address if you indicate that you would like to a copy of the report summary upon completion of the research study in January 2015. You will be able to ask questions related to the study before and after the completion of the questionnaire.

Prize draw

You can also choose to enter into a separate survey prize draw to win one of two £50 Amazon vouchers. Just enter your preferred contact details for the prize draw (e.g. email address). Your details cannot be connected to your questionnaire responses.

What are the possible disadvantages and risks of taking part?

Firstly, being part of this research will involve you giving up your time to complete this questionnaire. As some of the questions ask about sensitive issues you may find it difficult to think about these issues. You do not have to disclose anything you do not wish to. If you did require some additional support we have provided contact details for some support services at the end of this information sheet.

What are the possible benefits of taking part?

Taking part will give you an opportunity to think about your non use of steroids, without judgement. Also, you will be making a valuable contribution to the understanding of why individuals chose to not use steroids, which might benefit others.

What if there is a problem?

If you have a concern about any aspect of this study, you should ask to speak to the researchers who will do their best to answer your questions. The researchers contact details are given at the end of this information sheet.

Will my taking part in the study be kept confidential?

Yes. All information collected about you during the course of the research will be kept strictly confidential. You will not be asked to supply your name, address or any identifiable information. You will be assigned a participant numerical code number, a pseudonym and the first four digits of your DOB will be used at the time of consent to maintain confidentiality/anonymity of the data. For example, Henry Agger will be converted to "001_HA_1610". All of your data and transcripts will be securely stored on a password-protected computer-file only accessible by the researcher and research supervisors. This will be stored in a locked filing cabinet at the University of Lincoln and placed in archive storage for seven years in accordance with the University of Lincoln storage Policy

However, if the researcher has any concerns for your or other people's safety, then this information would be shared with the appropriate third party agencies so it can be managed appropriately. If the researcher intended to share information they would usually discuss this with you first.

What will happen if I don't want to carry on with the study?

Your participation is voluntary and you are free to withdraw at any time, without giving any reason. You may also contact Harry Ager two weeks after completing the questionnaire if you decide to withdraw your data from the study. However, after this time period the information collected so far cannot be erased as it will be transcribed in preparation to be used in the project analysis.

What will happen to the results of the research study?

The results of the study will be written up into a report that will be assessed by The University of Lincoln in January 2015 as part of the Trent Doctorate in Clinical Psychology (DClinPsy). The research will be submitted for publication in a journal. You will not be identified in any presentation of the data. If you would like a summary of the study findings, please indicate this on the consent form and you will be sent a copy via email in January 2015.

Who has reviewed the study?

All research is looked at by independent group of people, called a Research Ethics Committee, at the University of Lincoln to protect your interests. This study has been reviewed and given favourable opinion by the University of Lincoln's Research Ethics Committee.

Thank you for reading this information sheet. If you would like to take part in this study please contact Harry Ager via the email address provided at the end of the information sheet.

Further information and contact details:

Harry Ager, Email Address: 12354164@students.lincoln.ac.uk

Supervised by:

Dr Nima Moghaddam, Research Tutor, Email Address:

NMoghaddam@post01.lincoln.ac.uk

Dr Roshan Nair, Research Tutor, Email Address: Roshan.Nair@nottingham.ac.uk

Doctorate in Clinical Psychology
University of Lincoln
Faculty of Health, Life and Social Sciences
1st Floor, Bridge House
Brayford Pool,
Lincoln,
LN6 7TS

Support services and Helplines:

Please contact your GP/Physician for more information.

Anabolic Steroids, DAN 24/7 helpline, Freephone 0808 808 2234 or text DAN to 81066.

You can talk confidentially to an advisor (Only available in the UK).

Resource International website: Steroid.com found at: <http://www.steroid.com/>

Appendix N: Phase Two: Survey for Non-steroid-users



Questionnaire

(Version 1.0: 22.07.14:)

Title of Study: "Examining psychosocial factors associated with adult male non-steroid use among gym users"

Section 1

A What is your age?.....

B Please select, the ethnicity that best describes you:

White

White British

White Irish

Other white

Mixed

White and Black Caribbean

White and Black African

White and Asian

Any other Mixed

Asian or Asian British

Indian

Pakistani

Bangladeshi

Any other Asian

Black or Black British

Caribbean

African

Any other Black

Chinese or other ethnic group

Chinese

Any other ethnic group

C Please select, the highest level of education you have completed:

No formal qualifications

-

Less than a High School Diploma

GCSEs (previously O Levels)

14-16

-

A-Levels, AS-Levels, NVQs, Diplomas

16-18

High School Graduate

Higher Education at University, Technical College

18+

University, Technical College or Community College

D How many years have you spent in full time education?

.....

E Please select, your current employment status:

Employed for wages

Self-employed

Out of work and looking for work

Out of work but not currently looking for work

A student

Retired

Unable to work

F What is your occupation?

.....

- G** Please select, your marital status: Single, never married
Married, civil partnership or domestic partnership
Widowed
Divorced
Separated
Other (please specify).....
- H** There are a number of negative side effects of using steroids. What do you think are the 5 most important side effects of steroids?
- I** Please select, if you have ever used steroids? Yes
No
If no, please go to question N.
- J** If yes, did you use: Tablets
Jabs/injections
Both
- K** How many times have you used steroids?
- L** Please select, if you currently use steroids? Yes
No
- M** Please describe your average use?
- N** How often do you attend the gym (e.g., 3 times a week)?
- O** Please select, the length of time you spend at the gym per session? 0-30 minutes
30-45 minutes
45-60 minutes
60-90 minutes
90 minutes +
- P** Please select which of the following you most consider yourself to be: Recreational exerciser
Competitive bodybuilder
Competitive weightlifter
Competitive athlete
Personal trainer
Other (please specify).....
- Q** Do you drink alcohol? Yes/No
- R** Do you smoke tobacco? Yes/No

S Do you use recreational drugs? (e.g., cannabis, cocaine) Yes/No

If yes, please state the most common recreational drug that you use:

Section 2

Instructions

Please select the number below that best describes your opinion to each statement.

- | | | |
|----|--|-------------------------------|
| 1 | If I use steroids, I will build up my muscles more quickly | Unlikely 1 2 3 4 5 6 7 Likely |
| 2 | If I use steroids, I will enhance my recovery time (e.g., reduce injury) | Unlikely 1 2 3 4 5 6 7 Likely |
| 3 | If I use steroids, I will increase my strength | Unlikely 1 2 3 4 5 6 7 Likely |
| 4 | If I use steroids, I will improve my physical appearance | Unlikely 1 2 3 4 5 6 7 Likely |
| 5 | If I use steroids, I will enhance my potential/training ability (e.g., push beyond plateau) | Unlikely 1 2 3 4 5 6 7 Likely |
| 6 | If I use steroids, my mood will improve | Unlikely 1 2 3 4 5 6 7 Likely |
| 7 | If I use steroids, I will improve my competitive performance | Unlikely 1 2 3 4 5 6 7 Likely |
| 8 | If I use steroids, they will cause me visible/physical side effects (e.g., testicles shrinking, skin problems) | Unlikely 1 2 3 4 5 6 7 Likely |
| 9 | If I use steroids, they will cause me internal side effects (e.g., organ damage, risk of infection) | Unlikely 1 2 3 4 5 6 7 Likely |
| 10 | If I use steroids, my mood will be negatively affected (e.g., increased anger, mood swings) | Unlikely 1 2 3 4 5 6 7 Likely |
| 11 | If I use steroids, I will become dependent on them | Unlikely 1 2 3 4 5 6 7 Likely |
| 12 | Steroids will be made legal | Unlikely 1 2 3 4 5 6 7 Likely |
| 13 | Steroids will be accessible over the counter | Unlikely 1 2 3 4 5 6 7 Likely |

14	I will be able to identify a reliable supplier	Unlikely 1 2 3 4 5 6 7 Likely
15	I will have enough money to buy steroids	Unlikely 1 2 3 4 5 6 7 Likely
16	I can be certain about the quality of supplied steroids	Unlikely 1 2 3 4 5 6 7 Likely
17	Building up my muscles more quickly is	Extremely undesirable -3 -2 -1 0 1 2 3 Extremely desirable
18	Enhancing my recovery time (e.g., reducing injury) is	Extremely undesirable -3 -2 -1 0 1 2 3 Extremely desirable
19	Increasing my strength is	Extremely undesirable -3 -2 -1 0 1 2 3 Extremely desirable
20	Improving my physical appearance is	Extremely undesirable -3 -2 -1 0 1 2 3 Extremely desirable
21	Enhancing my potential/training ability (e.g., push beyond plateau) is	Extremely undesirable -3 -2 -1 0 1 2 3 Extremely desirable
22	Improving my mood is	Extremely undesirable -3 -2 -1 0 1 2 3 Extremely desirable
23	Improving my competitive performance is	Extremely undesirable -3 -2 -1 0 1 2 3 Extremely desirable
24	Experiencing visible/physical side effects (e.g., testicles shrinking, skin problems) is	Extremely undesirable -3 -2 -1 0 1 2 3 Extremely desirable
25	Experiencing internal side effects (e.g., organ damage, risk of infection) is	Extremely undesirable -3 -2 -1 0 1 2 3 Extremely desirable
26	Experiencing negative mood (e.g., increased anger, mood swings) is	Extremely undesirable -3 -2 -1 0 1 2 3 Extremely desirable
27	Becoming dependent is	Extremely undesirable -3 -2 -1 0 1 2 3 Extremely desirable
28	Most other people (e.g., non-users and wider society) would	disapprove -3 -2 -1 0 1 2 3 approve if I used steroids
29	My family would	disapprove -3 -2 -1 0 1 2 3 approve if I used steroids
30	Other bodybuilders and gym-users	do not -3 -2 -1 0 1 2 3 do use steroids
31	Medics think I	should not -3 -2 -1 0 1 2 3 should use steroids
32	My friends would	disapprove -3 -2 -1 0 1 2 3 approve if I used steroids
33	My partner (e.g., girlfriend/boyfriend) would	disapprove -3 -2 -1 0 1 2 3 approve if I used steroids
34	Athletes and coaches think I	should not -3 -2 -1 0 1 2 3 should use steroids

35	Work colleagues and my employer would	disapprove -3 -2 -1 0 1 2 3 approve if I used steroids	
36	For me, using steroids would be	Harmful 1 2 3 4 5 6 7	Beneficial
37	For me, using steroids would be	Good 1 2 3 4 5 6 7	Bad
38	For me, using steroids would be	Enjoyable 1 2 3 4 5 6 7	Unenjoyable
39	For me, using steroids would be	The wrong thing to do 1 2 3 4 5 6 7	The right thing to do
40	What most other people (e.g., non-users and wider society) think I should do matters to me	Not at all 1 2 3 4 5 6 7 Very much	
41	What my family think I should do matters to me	Not at all 1 2 3 4 5 6 7 Very much	
42	Doing what other bodybuilders and gym-users do is important to me	Not at all 1 2 3 4 5 6 7 Very much	
43	Medics' approval of what I do is important to me	Not at all 1 2 3 4 5 6 7 Very much	
44	What my friends would think I should do matters to me	Not at all 1 2 3 4 5 6 7 Very much	
45	What my partner (e.g., girlfriend/boyfriend) thinks I should do matters to me	Not at all 1 2 3 4 5 6 7 Very much	
46	Athletes' and coaches' approval of what I do is important to me	Not at all 1 2 3 4 5 6 7 Very much	
47	What work colleagues and my employer think I should do matters to me	Not at all 1 2 3 4 5 6 7 Very much	
48	If steroids were legal, it would make it	much more difficult -3 -2 -1 0 1 2 3 much easier to use them	
49	The accessibility of steroids over the counter makes it	much more difficult -3 -2 -1 0 1 2 3 much easier to use them	
50	If I know a reliable supplier, I am	less likely -3 -2 -1 0 1 2 3 more likely to use them	
51	Having no money makes it	much more difficult -3 -2 -1 0 1 2 3 much easier to use them	
52	If I am uncertain about the quality of the steroid, I am	less likely -3 -2 -1 0 1 2 3 more likely to use them	
53	Most people who are important to me think that I should	1 2 3 4 5 6 7 should not use steroids	
54	I intend to use steroids in the next six months	Strongly disagree 1 2 3 4 5 6 7 Strongly agree	

55	It is expected of me that I use steroids	Strongly disagree	1 2 3 4 5 6 7	Strongly agree
56	I am confident that I could use steroids if I wanted to	Strongly disagree	1 2 3 4 5 6 7	Strongly agree
57	For me to use steroids is	Easy	1 2 3 4 5 6 7	Difficult
58	I plan to use steroids in the next six months	Strongly disagree	1 2 3 4 5 6 7	Strongly agree
59	Whether I use steroids is entirely up to me	Strongly disagree	1 2 3 4 5 6 7	Strongly agree
60	The decision to use steroids is beyond my control	Strongly disagree	1 2 3 4 5 6 7	Strongly agree
61	I feel under social pressure to use steroids	Strongly disagree	1 2 3 4 5 6 7	Strongly agree
62	I will use steroids in the next six months	Strongly disagree	1 2 3 4 5 6 7	Strongly agree

Appendix O: Phase One: Additional Demographic Characteristics

Table O.1.

Demographic characteristics n = 28

Characteristic	N	%
Age	-	-
Age ranged from 18 to 55, <i>M</i> = 34		
Ethnicity		
White British	13	46.4%
White	8	28.6%
White Irish	2	7.1%
Indian	2	7.1%
Other	3	10.8%
Educational attainment		
Higher education qualification below degree level, (e.g., diploma)	7	25%
Bachelor's degree (e.g., BSc) or professional equivalent	6	21.4%
GCSEs (previously O Levels)	5	17.9%
No formal qualifications	4	14.3%
Other	6	21.3%
Current employment status		
Employed for wages	22	78.6%
Self-employed	4	14.3%
A student	2	7.1%
Annual income		
£40,000-£49,999+	9	32.1%
<£19,999	8	28.6%
£30,000-£39,999	6	21.4%
£20,000-£29,999	5	17.9%
Marital status		
Married, in a civil partnership or domestic partnership	15	53.6%
Single, never married	11	39.3%
Other	2	7.2%

Table O.2.

Continued

Steroid-usage characteristics	N	%
Age of first use of steroids		
Age ranged from 17 to 48, $M = 26$	-	-
Steroids normally used/preferred		
Testosterones	22	78.6%
Dianabol	3	10.7%
None of the above/other	3	10.7%
Method of administration		
Both	17	60.7%
Jabs/injections	6	21.4%
Tablets	5	17.9%
Total number of times used		
Between 2-10 times	15	53.6%
More than 10 times	9	32.1%
1 time	4	14.3%
Average number of weeks "on" steroids per course/cycle		
12 weeks	9	32.1%
6 weeks	3	10.7%
16 weeks	3	10.7%
12-16 weeks	3	10.7%
Other	10	35.8%
Average number of weeks "off" steroids between course/cycle		
12 weeks	6	21.4%
16 weeks	5	17.9%
8 weeks	3	10.7%
12-16 weeks	3	10.7%
24 weeks	3	10.7%
Other	8	28.6%
Average number of time steroids were used per year		
Twice	9	32.1%
Once	5	17.9%
Two-three	5	17.9%
Constantly	3	10.7%
Other	6	21.3%
Used more than one steroid per cycle (i.e., stacking)		
Yes	24	85.7%
No	4	14.3%

Examples of a typical course/stack:

Participants who have used steroids 1 time: *Testosterone and deca* (P4).

Pyramid system (P16).

2-10 times: *Testosterone Enanthate at 500mg per week* (P9). *Test 250 mgs Trenbolone 400 mgs, Dianabol 20-30mgs* (P24).

More than 10 times: *Dianabol, Growth, Deca* (P14). *Testosterone, HGH, an oral steroid and Arimidex* (P23).

Example of a heaviest course/stack a participant ever used:

1 time: *Same course as above* for (P4) and (P16).

2-10 times: *Testosterone mgs 250 Trenbolone 400 mgs* (P9). *Testosterone 250 mgs Trenbolone 400 mgs, Dianabol 20-30mgs* (P24).

More than 10 times: *Same as above* (P14). *"It was about 2,650 mg per week of mostly different esters of Testosterone and a small amount of Trenbolone. It was too much"* (P23).

Table O.3.

Continued

Gym use and lifestyle characteristics	N	%
Average weekly frequency of gym attendance (e.g., 3 times a week)		
Five	10	35.7%
Three	5	17.9%
Three/four	4	14.3%
Four	3	10.7%
Four/five	3	10.7%
Five+	3	10.7%
Length of time participants spend at the gym per session (e.g., 45 minutes)	11	39.3%
45-60 minutes	8	28.6%
30-45 minutes	6	21.4%
60-90 minutes	3	10.7%
90-120 minutes		
Alignment (type of exerciser)		
Recreational exerciser	21	75%
Competitive bodybuilder	3	10.7%
Competitive athlete	3	10.7%
None of the above	1	3.6%
Drank alcohol		
Yes	16	57.1%
No	12	42.9%
Smoked tobacco		
No	22	78.6%
Yes	6	21.4%
Used recreational drugs		
No	21	75%
Yes	7	25%
Type of drugs		
Cannabis	3	42.9%
Cocaine	3	42.9%
Amphetamines	1	14.3%

Appendix P: Example of the Coding Framework for the Development of Behavioural Beliefs (Advantages of Steroid-use)

Categories of beliefs elicited: What do you believe are the advantages of using steroids?														
Themes	Enhance rest and recovery	Enhances potential/Training and ability	Athletic performance goals	Optimise dietary regime and healthy-living		Develop strength	Achieve desired body form					Improve subjective wellbeing		
Category	Enhances recovery/reduces injuries	Enhances potential/Training and ability	Athletic performance goals	Optimise dietary regime/Improve health		Strength	Faster muscle gain ('bulking up')		Improving appearance/definition ('leaning out')		Maintenance	Sexual wellbeing	Positive affect	Self-confidence
Sub-category	Enhances rest and recovery/reduces injuries	Enhances potential/Training and ability	Athletic performance goals	Optimise dietary regime	Improve health	Strength	Muscle gain	Better use of nutrition	Appearance	Toning	Maintenance	Increase libido	Enhance mood (hedonic tone and energetic arousal)	Increase confidence
Codes	Recovery time Improved recovery Faster recovery Quicker recovery Quicker repair Recovery Enhanced recovery Better resting time by the body Better sleep Helping injuries Less injuries Makes you better (12)	Surpass natural potential (1) + Plateau, Reach next level at gym, Reached a plateau Reached a plateau, Reached a plateau Push beyond genetic capability push self to limits (8) + Train better when on cycle Better training when using Train harder (11)	Compete, To compete in bodybuilding To compete Competitive purposes Progress as an elite athlete (5) + Aid profession Progress as an elite athlete (7)	+ Eat better when on cycle Eat clean More focused healthier eating (+3)	+ Improved long-term health Health benefits (+2)	Being Strong Strong More strength Strength Increased strength Increased strength Stronger Strength Enhanced strength Strength Stronger Competitive strength (11)	Build up muscles Mass gain Gain size Gain muscle mass High muscle gain Quicker gains Accelerated growth Muscle growth Increased muscle mass Gain Size Quicker gains Faster gains Muscular hypertrophy Increased body mass Noticeable growth (15)	Better use of nutrition Protein synthesis (2)	Improved appearance Improved physique Physique Change physical appearance Looking better Looking good Positive physical changes (7) + Aesthetic enhancement Used to look good Image (10)	Conditioning Solid muscles More definition and tone Reduced body fat (4) + Getting ripped (5?)	Maintain muscle mass Keep size, (2)	Improved sex life Increased libido Increased sex drive Better sexual enjoyment Libido (5)	Feel fantastic Sense of wellbeing Mood Far calmer Happier person More energy Focus More focused Aggression (6) + Feeling good pumped feel good Increased power/energy (9)	Improved confidence More outgoing Improved sense of self Better confidence (4)

Appendix Q: Example of Categorisation of the Disadvantages of Using Steroids for the Development of Behavioural Beliefs

What do you believe are the disadvantages of using steroids?

Themes	Visible Physical side effects				Internal physical side effects			Secondary injuries (associated with injecting or distal consequence of more intensive training)		Behavioural and psychological consequences		
Category	Visible Physical side effects				Enlarged Prostate	Organ Damage		Secondary injuries (associated with injecting or distal consequence of more intensive training)		Anger/mood swings	Potential misuse and dependence	
Sub- category	Skin problems	Testicular atrophy	Breast development /gyno	Hair loss/growth	Enlarged Prostate	Organ Damage	Risk of infection/concerns of impact on body	Pains/abscesses in injecting sites	Tendon & other injuries	Increased aggression	Mood swings	Potential misuse and dependence
Codes												

12 subcategories in total/100 x75% of the overall coverage from the responses (as stated in the manual) = 9 Therefore include 9 of the subcategories below?
 71 individual codes in total /100 x20% = 14.2 random individual codes below (left) to be allocated into the coding table.

Injecting sites
 Rage
 Substance abuse
 Ill health
 Organ damage
 Risk of infection
 Tendon injuries
 Mood swings
 Testicles shrinking
 Hair loss
 Infertility
 Skin problems
 Breast development
 High blood pressure

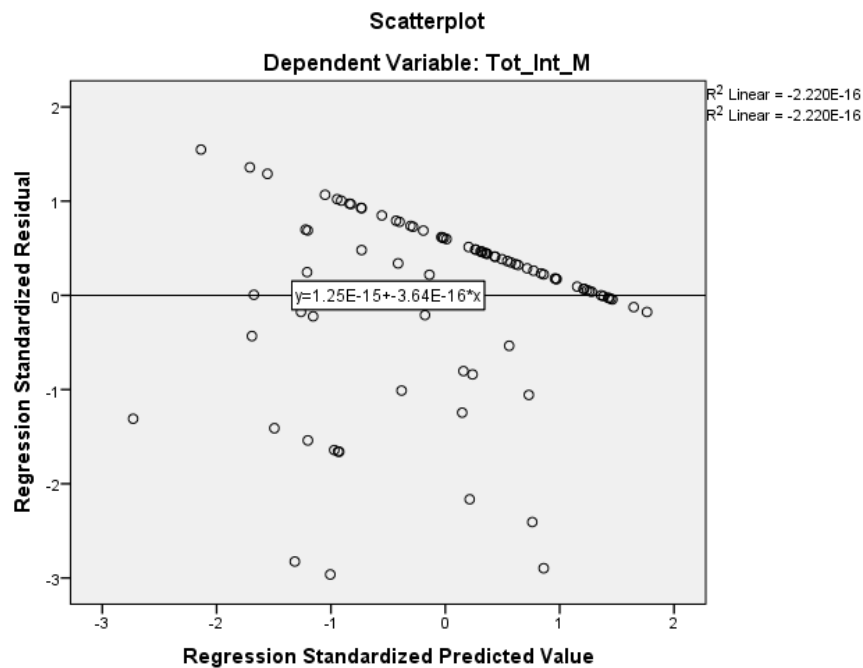
Rank order of subcategories		
1.	Organ damage	11
2.	Increased aggression	11
3.	Testicular atrophy	10
4.	Potential misuse and dependence	8
5.	Skin problems	7
6.	Mood swings	6
7.	Risk of infection/concerns of impact on body	6
8.	Breast development	3
9.	Hair loss/growth	3
10.	Pains/abscesses in injecting sites	3
11.	Tendon & other injuries	2
12.	Enlarged prostate	1

Appendix R: Example of Kappa Test (Disadvantages of Using Steroids) for the Development of Behavioural Beliefs

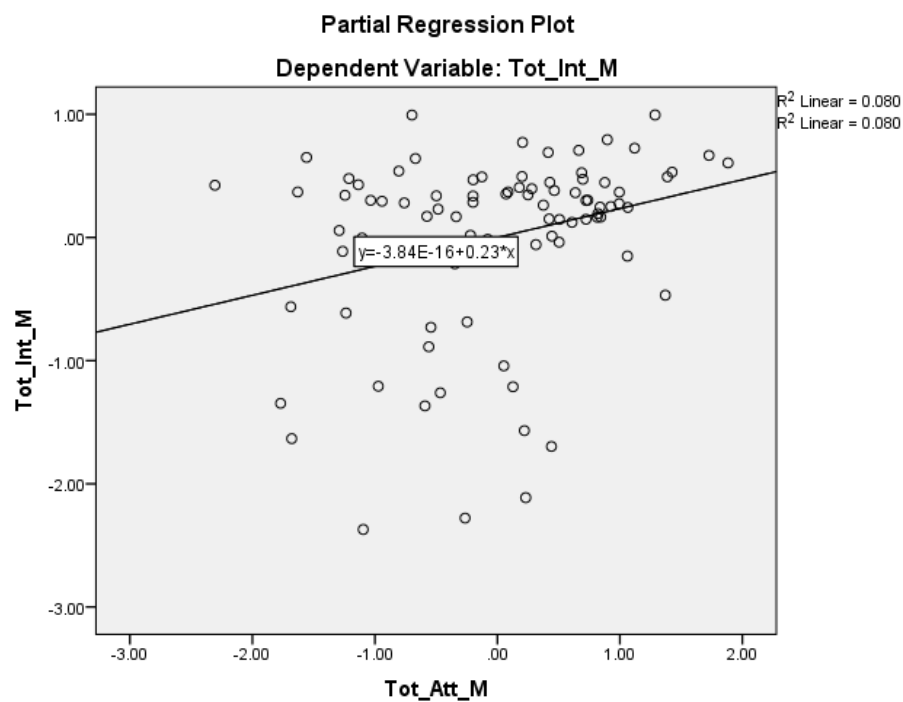
Rater = HA	Categories	Rater = NGM													Total
		1	2	3	4	5	6	7	8	9	10	11	12	13	
	1. Skin problems	2	0	0	0	0	0	0	0	0	0	0	0	0	2
	2. Testicular atrophy	0	4	0	0	0	0	0	0	0	0	0	0	0	4
	3. Breast development	0	0	2	0	0	0	0	0	0	0	0	0	0	2
	4. Hair loss/growth	0	0	0	2	0	0	0	0	0	0	0	0	0	2
	5. Enlarged Prostate	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	6. Organ damage	0	0	0	0	0	4	0	0	0	0	0	0	0	4
	7. Risk of infection	0	0	0	0	0	0	4	0	0	0	0	0	0	4
	8. Pains/abscesses..	0	0	0	0	0	0	0	2	0	0	0	0	0	2
	9. Tendon & other..	0	0	0	0	0	0	0	0	2	0	0	0	0	2
	10. Increased aggression	0	0	0	0	0	0	0	0	0	2	0	0	0	2
	11. Mood swings	0	0	0	0	0	0	0	0	0	0	2	0	0	2
	12. Potential misuse	0	0	0	0	0	0	0	0	0	0	0	2	0	2
	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	2	4	2	2	0	4	4	2	2	2	2	2	0	28
Po		1													
Pe		0.102040816													
K		1													

The Kappa statistic you should report is highlighted in yellow, just put the observed frequency counts in the table above, and the Kappa statistic will be calculated automatically. Data entry basics: Each cell in the table is defined by its row and column. The rows designate how each item was classified by the first rater (HA). The columns designate how the other rater (NGM) classified the items. Example: Enter into row 2 of column 1 the no. of items that the first rater classified into category two and the second rater classified into category one. Enter into column 2 of row 2 the no. of items classified by both raters into category two (the diagonal of the table tallies inter-rater agreement).

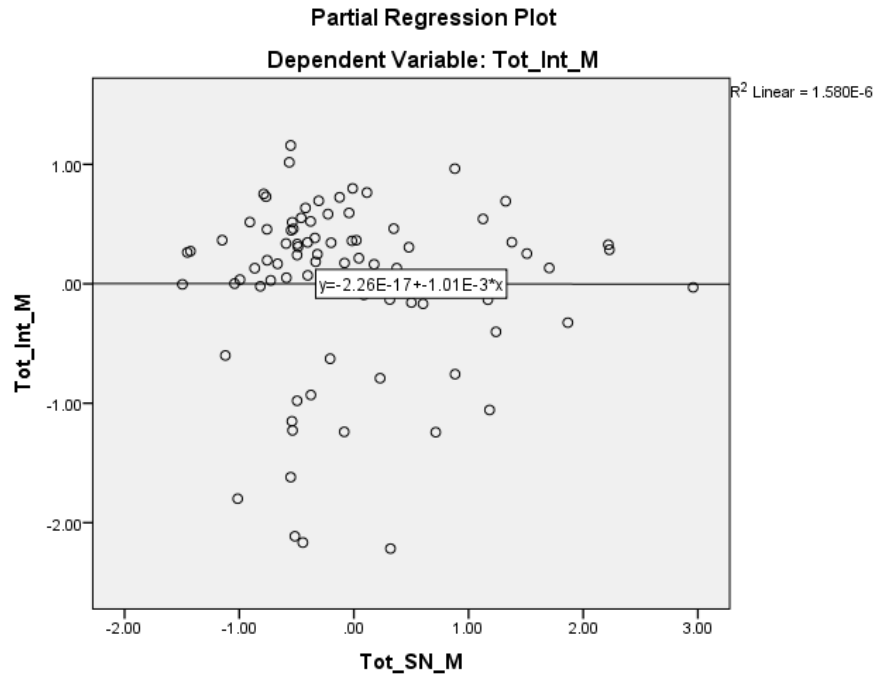
Appendix S: Linearity Plots for the Multiple Regression Model



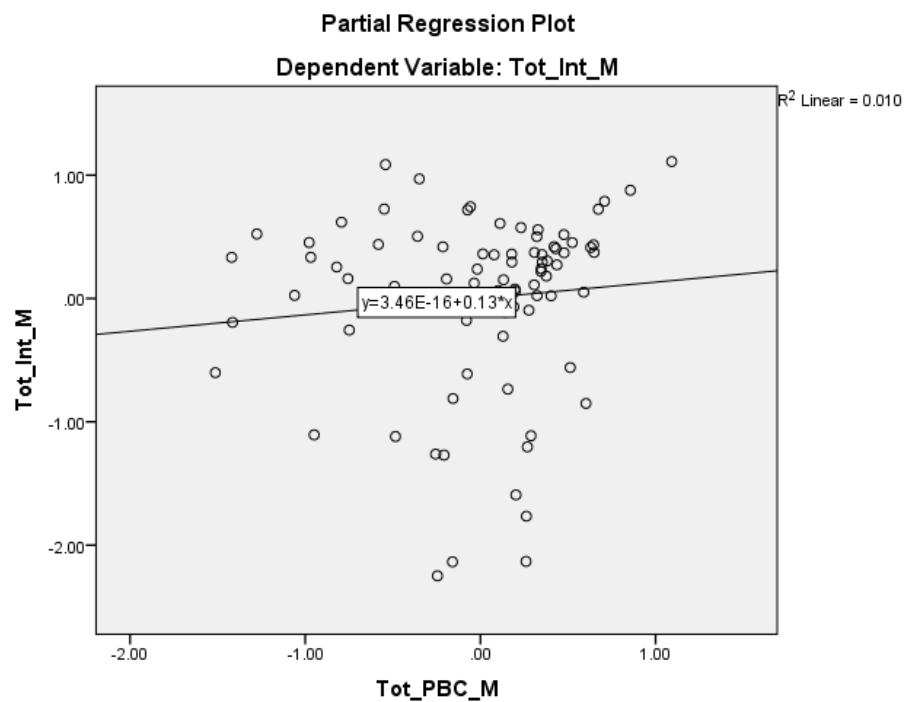
Graph 1: Linearity plot for the dependent variable 'intention'



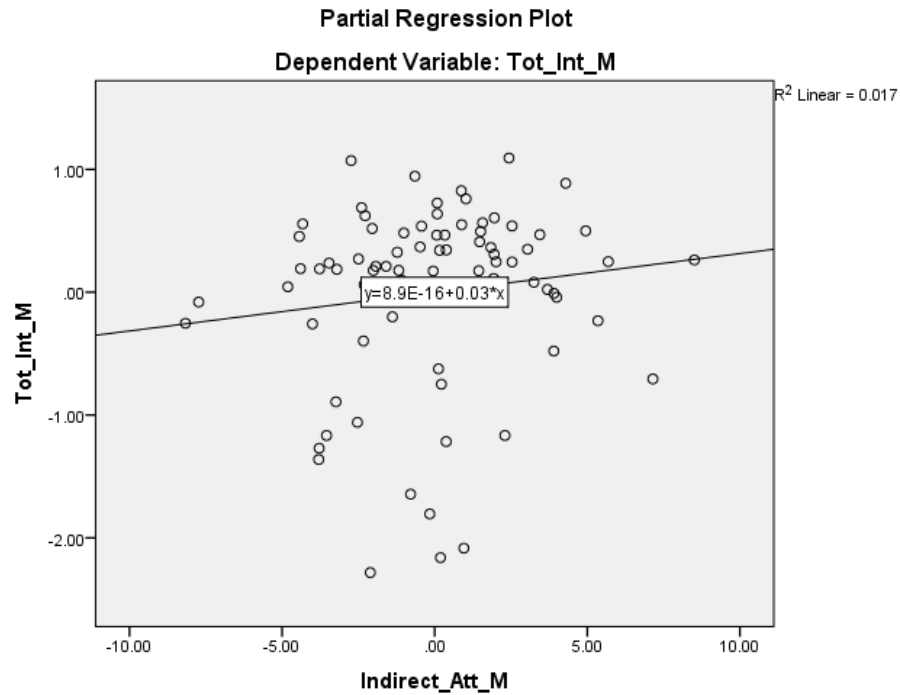
Graph 2: Linearity plot of the relationship between 'attitude' (independent variable) and 'intention' (dependent variable)



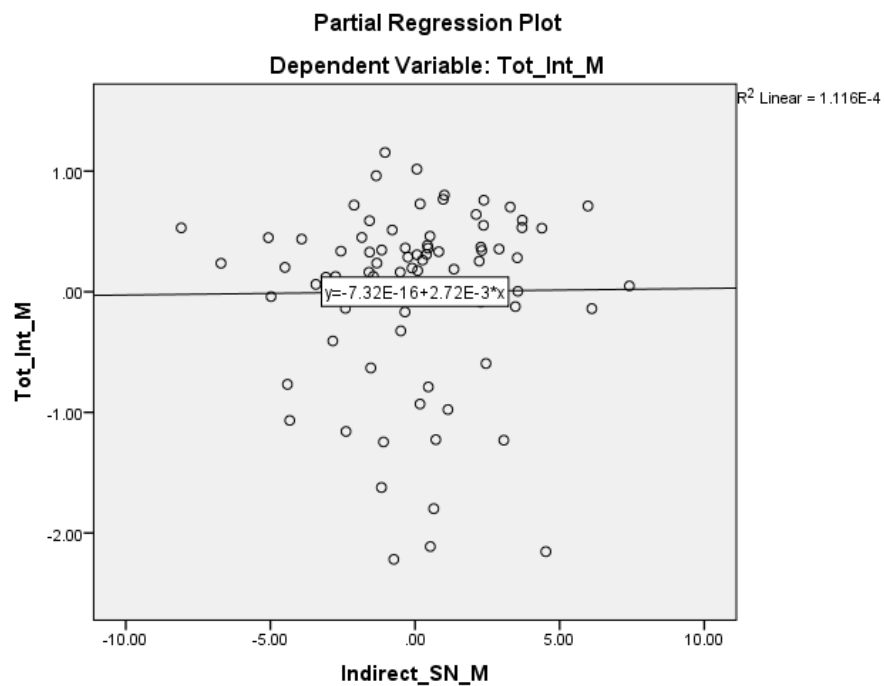
Graph 3: Linearity plot of the relationship between 'subjective norm' (independent variable) and 'intention' (dependent variable)



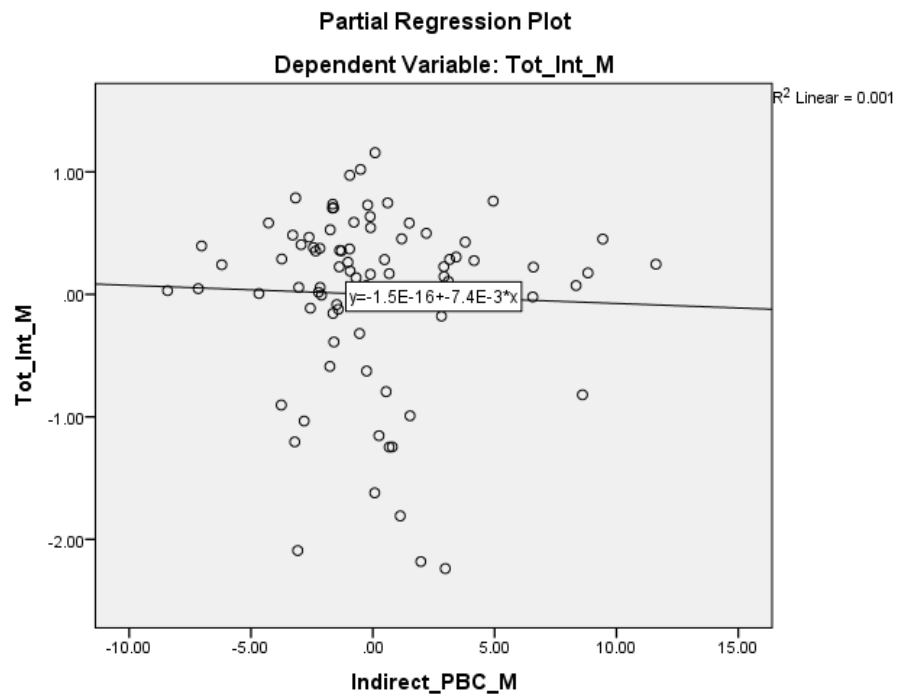
Graph 4: Linearity plot of the relationship between 'PBC' (independent variable) and 'intention' (dependent variable)



Graph 5: Linearity plot of the relationship between 'behavioural beliefs' (independent variable) and 'intention' (dependent variable)

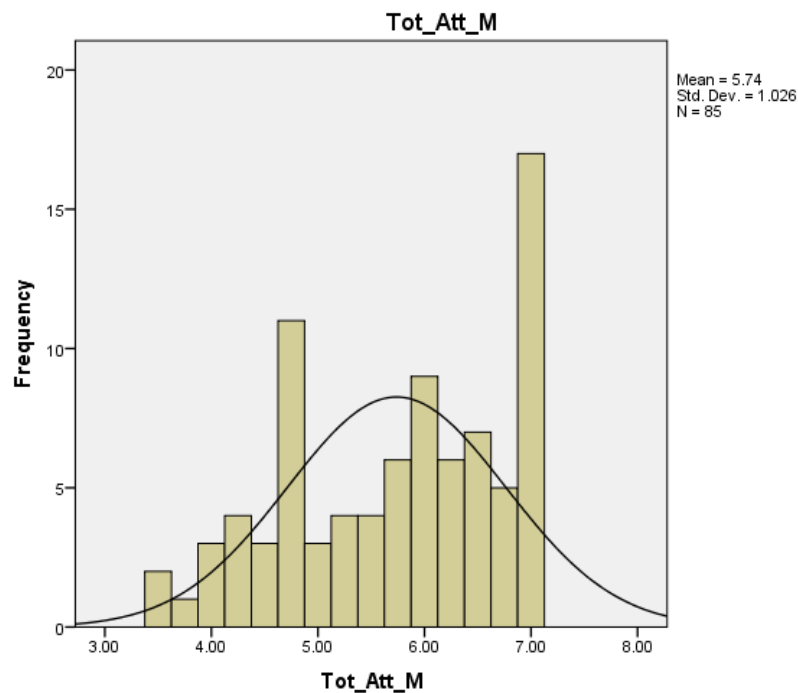


Graph 6: Linearity plot of the relationship between 'normative beliefs' (independent variable) and 'intention' (dependent variable)

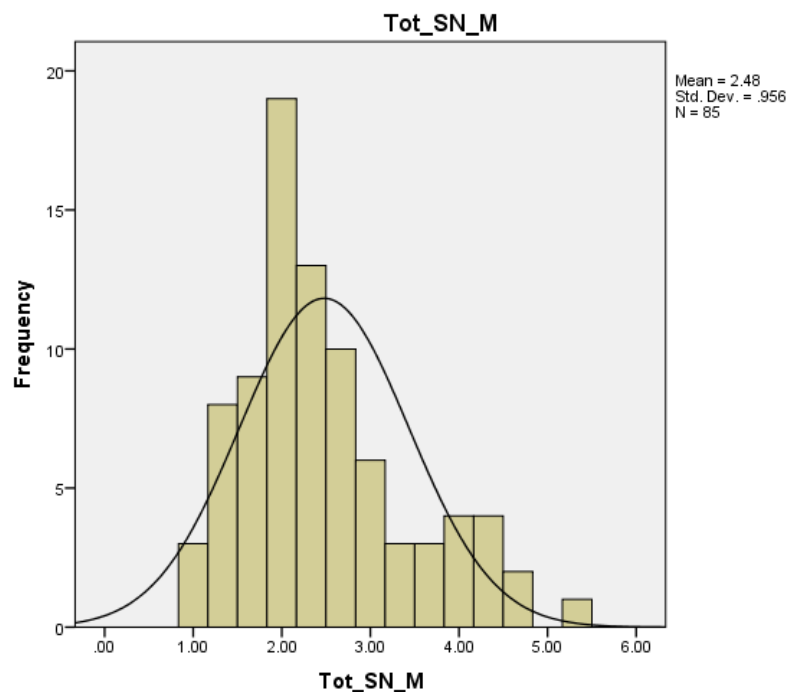


Graph 7: Linearity plot of the relationship between 'control beliefs' (independent variable) and 'intention' (dependent variable)

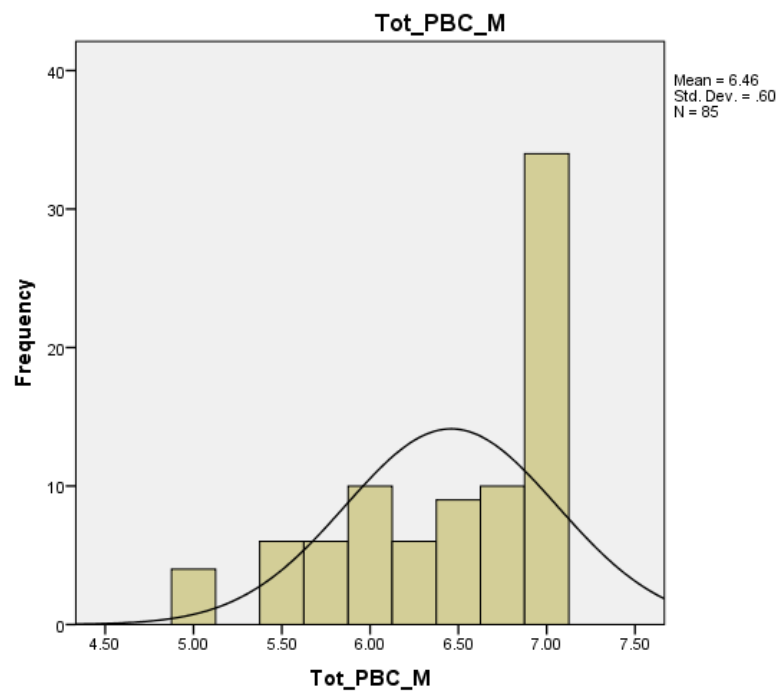
Appendix T: A Selection of Histograms to Test for Normality for the Multiple Regression Model



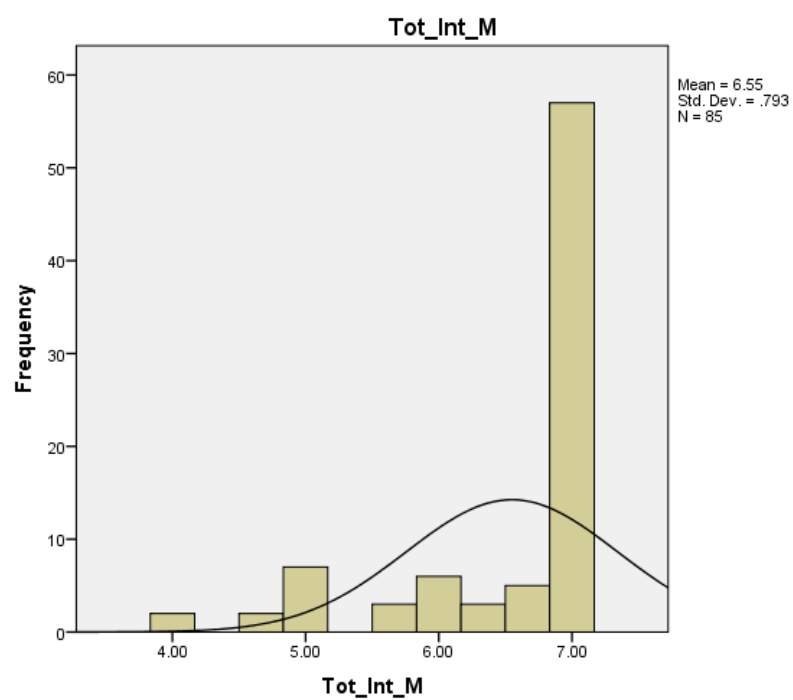
Graph 8: Checking normality for the variable 'attitude'



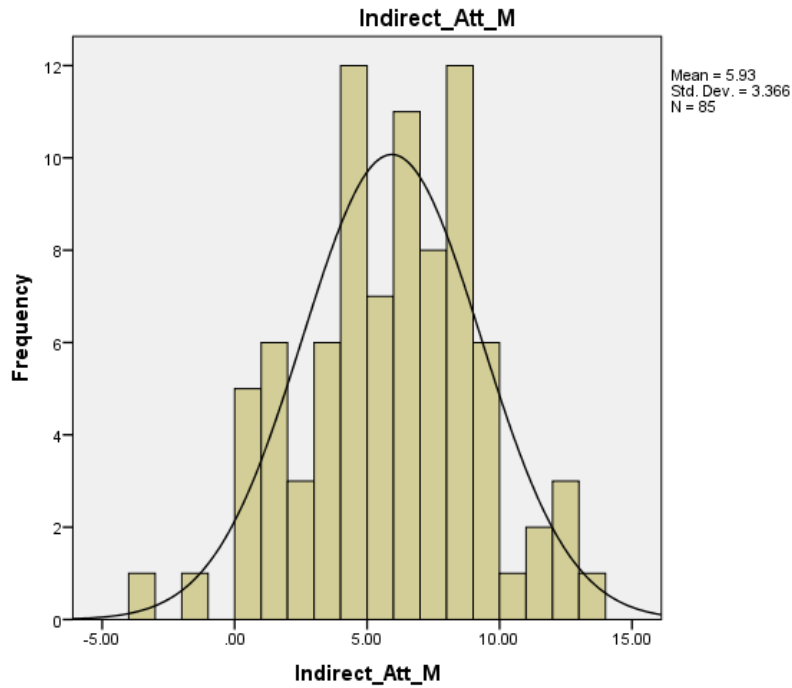
Graph 9: Checking normality for the variable 'subjective norm'



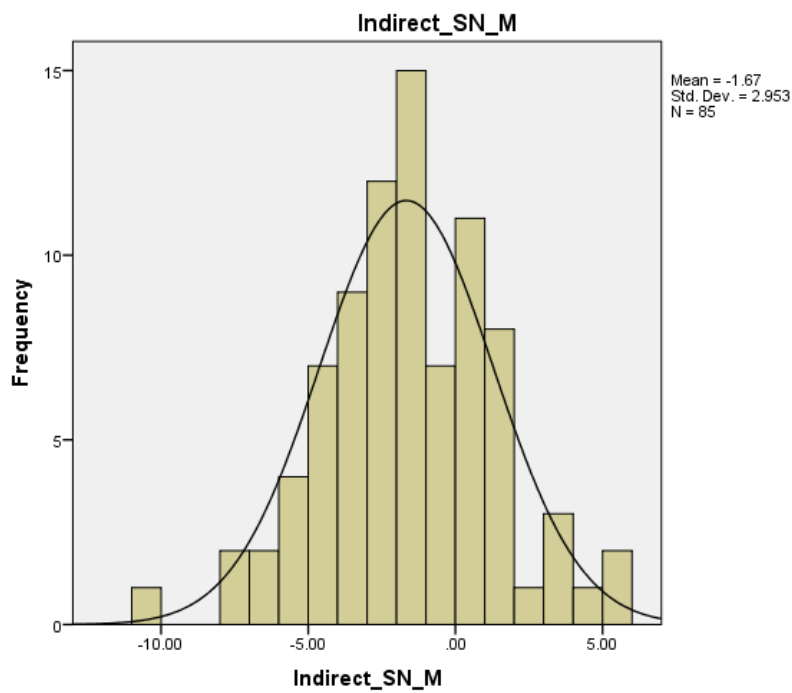
Graph 10: Checking normality for the variable 'PBC'



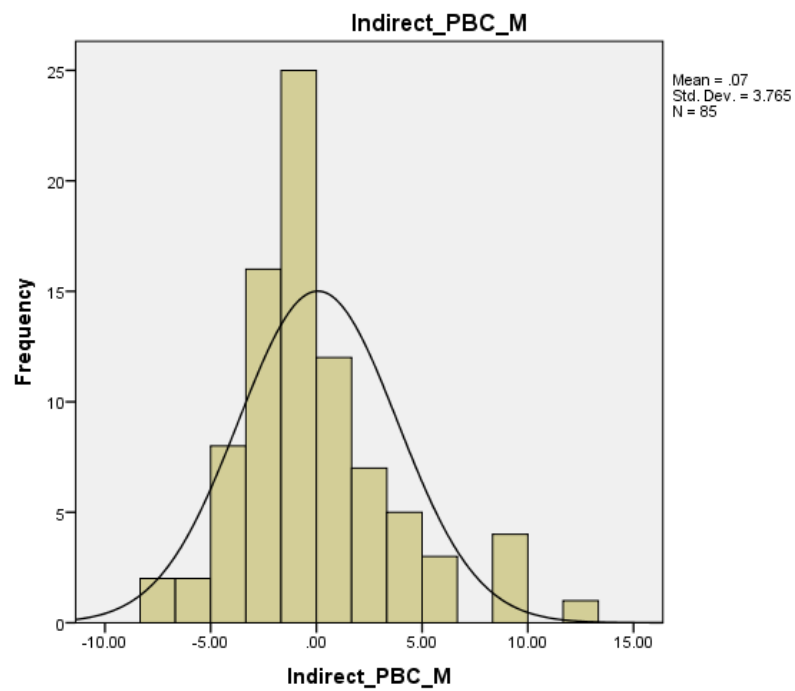
Graph 11: Checking normality for the variable 'intention'



Graph 12: Checking normality for the variable 'behavioural beliefs' (indirect measure of attitude)



Graph 13: Checking normality for the variable 'normative beliefs' (indirect measure of subjective norm)



Graph 14: Checking normality for the variable 'control beliefs' (indirect measure of PBC)

Appendix U: Converted Z-scores for Skewness and Kurtosis for all Variables for the Multiple Regression Model

Table U.1

converted z-scores for skewness and kurtosis for all variables

		Z-score
Intention	Skewness	-6.59*
	kurtosis	3.65*
Attitude	Skewness	-1.46
	Kurtosis	-1.95
Subjective norms	Skewness	3.37*
	Kurtosis	0.56
PBC	Skewness	-3.30*
	Kurtosis	-0.64
Behavioural beliefs	Skewness	-0.71
	Kurtosis	-0.09
Normative beliefs	Skewness	-0.21
	Kurtosis	0.88
Control beliefs	Skewness	4.10*
	kurtosis	3.60*

Note. $p < 0.05^$*

Appendix V: VIF and Tolerance Scores for the Multiple Regression Model

Table V.1.

VIF and Tolerance Scores for the Regression model

Outcome Variable	Predictor variables	VIF Score	Tolerance Score
Intention	Attitude	1.281	.781
	Subjective Norm	1.138	.879
	PBC	1.213	.824
	Behavioural Beliefs	1.248	.801
	Normative Beliefs	1.113	.899
	Control Beliefs	1.079	.927

Appendix W: VIF and Tolerance Scores for the Logistic Regression Models

Table W.1.

VIF and Tolerance Scores for the Logistic Regression model for the direct TPB measures

Outcome Variable	Predictor variables	VIF Score	Tolerance Score
Intention	ATT	4.315	.232
	SN	1.688	.592
	PBC	3.926	.255

Note. ATT = attitude; SN = subjective norm; PBC = perceived behavioural control.

Table W.2.

VIF and Tolerance Scores for the Logistic Regression model for the indirect TPB measures

Outcome Variable	Predictor variables	VIF Score	Tolerance Score
Intention	BB x OE	1.911	.523
	NB X MC	1.834	.545
	CB X P	1.066	.938

Note. BB x OE = behavioural beliefs multiplied by outcome evaluates; NB x MC = normative beliefs multiplied by motivation to comply; and CB x P = control belief multiplied by power.

Appendix X: Phase Two: Additional Demographic Characteristics

Table X.1.

Demographic characteristics n = 160, 85 Steroid-users (SU), and 75 Non-steroid-users (NSU)

Characteristic	Com N	%	SU N	%	NSU N	%
Age						
18-25	35	21.9%	24	28.2%	11	14.7%
26-33	66	41.3%	31	36.5%	35	46.7%
34-41	33	20.6%	15	17.6%	18	24%
42-49	14	8.8%	8	9.4%	6	8%
50-57	11	6.9%	7	8.2%	4	5.3%
	Range 18 to 55, M = 32		Range 18 to 55, M = 32		Range 19 – 59, M = 33	
Ethnicity						
White British	104	65%	48	56.5%	56	74.7%
White	31	19.4%	25	29.4%	6	8%
Other White	6	3.8%	5	5.9%	1	1.3%
Other	19	11.8%	7	8.2%	12	16%
Highest level of education achieved						
Higher Education (e.g., at University) 18+	98	61.3%	48	56.5%	50	66.7%
A-Levels, AS-Levels, NVQs, Diplomas 16-18	40	25%	21	24.7%	19	25.3%
GCSEs (previously O Levels) 14-16	20	12.5%	15	17.6%	5	6.7%
Other	2	1.3%	1	1.2%	1	1.3%
Years in Education n = 149	Range 11 to 35, M = 14		Range 11 to 25, M = 13		Range 11 to 35, M = 15	
Current employment status						
Employed for wages	106	66.3%	55	64.7%	51	68%
Self-employed	30	18.8%	16	18.8%	14	18.7%
A student	15	9.4%	8	9.4%	7	9.3%
Other	9	5.6%	6	7.1%	3	4%
Occupation (major groups*)						
1: Managers (e.g., hospitality, team lead, Facilities, project).	25	15.6%	11	12.9%	14	18.7%
2: Professionals (e.g., information technology, banking, marketing, teachers, engineering).	60	37.5%	31	36.4%	29	38.7%
3: Technicians and associate professionals (e.g., leisure, sport, personal trainer).	16	10%	6	7.1%	10	13.3%
4: Service and sales workers (e.g., sales, call centre, insurance, concierge, cooks, personal care workers).	11	6.9%	8	9.4%	3	4%
5: Craft and related trades workers (e.g., construction, tree surgeon, electrician).	12	7.5%	10	11.8%	2	2.7%
6: Armed forces occupations, law enforcement (e.g., police and security officer, doorman, RAF).	13	8.1%	5	5.9%	8	10.6%
7: Student.	15	9.4%	8	9.4%	7	9.3%
8: Other (e.g., none/retired, agricultural, clerical support workers).	8	5%	6	7.1%	2	2.7%
Marital status						
Single, never married	78	48.8%	41	48.2%	37	49.3%
Married, in a civil partnership or domestic partnership	75	46.9%	39	45.9%	36	48%
Other	7	4.4%	5	5.9%	2	2.6%

Free-text Responses of the Side-effects Associated with Steroid-use

Three main themes emerged which covered the breadth of side-effects endorsed by both steroid-users and non-steroid-users. Notably, 10 steroid-users reported that there were no side-effects of steroid-use and two non-steroid-users did not know of any and therefore were not included in the analysis (frequency counts).

(1) Visible/physical side-effects included: testicular and penile atrophy, erectile dysfunction, acne, infections, abscess, gynecomastia (breast development), balding and excessive hair growth. Steroid-users endorsed 165 visible physical side-effects, which was similar to the number endorsed by the Non-steroid-users at 168.

(2) Internal side-effects included: endocrine diseases such as hypothalamic pituitary testicular axis (suppression of natural testosterone production) infertility, impotence, estrogenic imbalance, loss of libido, enlarged prostate, organ damage (kidney and liver), enlarged heart, increased blood pressure and cholesterol. Steroid-users reported 127 internal side-effects, compared with 80 for Non-steroid-users.

(3) Behavioural and psychological consequences included: anxiety, paranoia, depression, potential substance misuse and dependency, anger, mood swings, hypomania and insomnia. Finally, steroid-users reported 43 behavioural and psychological side-effects compared to the 29 listed by non-steroid-users.

Table X.1.1.

Demographic Characteristics n = 160, 85 Steroid-users (SU), and 75 Non-steroid-users (NSU)

Gym and lifestyle characteristic	Com N	%	SU N	%	NSU N	%
Gym attendance per week						
Five times	33	20.6%	17	20%	16	21.3%
Four times	30	18.7%	22	25.9%	8	10.7%
Three times	27	16.9%	7	8.2%	20	26.7%
Two times	18	11.3%	-	-	18	24%
Four/five times	17	10.6%	14	16.5%	3	4%
Six times	12	7.5%	8	9.4%	4	5.3%
Other	23	14.4%	17	20%	6	8%
Length of time spent at gym per session						
60-90 minutes	72	45%	40	47.1%	32	42.7%
45-60 minutes	59	36.9%	30	35.3%	29	38.6%
30-45 minutes	14	8.8%	9	10.5%	5	6.7%
90 minutes +	13	8.1%	6	7.1%	7	9.3%
Other	2	1.3%	-	-	2	2.7%
Type of exerciser						
Recreational exerciser	107	66.9%	54	63.5%	53	70.7%
Competitive athlete	22	13.8%	7	8.2%	15	20%
Competitive bodybuilder	16	10%	15	17.6%	1	1.3%
Other	15	9.4%	9	10.6%	6	8%
Drink Alcohol						
Yes	112	70%	47	55.3%	65	86.7%
No	48	30%	38	44.7%	10	13.3%
Smoke tobacco						
No	134	83.7%	69	81.2%	65	86.7%
Yes	26	16.3%	16	18.8%	10	13.3%
Use recreational drugs						
No	139	86.9%	71	83.5%	68	90.7%
Yes	21	13.1%	14	16.5%	7	9.3%
Types						
Cannabis	16	61.5%	11	55%	5	71.4%
Cocaine	5	19.2%	5	25%	-	-
Other	5	19.2%	4	20%	2	28.6%

Table X.1.2.

Additional Characteristics of steroid-users

Age of first steroid use: This ranged from the youngest at 15 to the oldest at 48 years old, $M = 26$. Notably, a large amount of participants started using steroids when they were 21 years old, followed closely by 22 and 24 year-olds, with 19 and 23 year-olds also representing a significant amount of participants.

Steroids normally used/preferred

Participants may have used a combination of multiple steroids (401 responses were obtained).

Compound	Popular trade name	Administration	N	%
Testosterone-Enanthate	N/A	Injectable	64	16%
Trenbolone-Hexahydrobenzylcarbonate	Parabolan	Injectable	49	12.2%
Methandrostenolone	Dianabol	Oral	38	9.5%
Testosterone-Propionate	N/A	Injectable	37	9.2%
Oxandrolone	Anavar	Oral	31	7.7%
Nandrolone-Decanoate	Deca-Durabolin	Injectable	29	7.2%
Testosterone-Cypionate	N/A	Injectable	29	7.2%
Drostanolone-Propionate	Masteron	Injectable	28	7%
Testosterone-Propionate-Phenylpropionate-Isocaproate-Decanoate	Sustanon-250	Injectable	25	6.2%
Stanozolol	Winstrol	Oral	20	5%
Boldenone-Undecylenate	Equipoise	Injectable	17	4.2%
Oxymetholone	Anadrol	Oral	14	3.5%
Other	-	Injectable/Oral	20	4.7%

Interestingly a large amount of participants ($n=25$) reported that they also use clenbuterol which is a powerful fat-burner. Several participants ($n=13$) also used human growth hormone which has many functions in the body (e.g., anabolic muscle building effect and increases the rate of fat loss) (Steroids.com, 2015).

Method of administration	N	%
Both	60	70.6%
Jabs/injectable	21	24.7%
Tablets/oral	4	4.7%

Average amount of time that steroids were used

A large amount of participants (17.6%) could not remember how many times that they had used steroids. This may imply that they have used steroids for long period of time and lost count and may possibly represent the more senior and experienced users and/or that they genuinely cannot remember the exact number. Interestingly participants responded with the number of years that they have been using steroids instead of the actually amount. Once again, this may imply that they have lost count and may be a more experienced steroid user.

Average amount of weeks that an individual stayed "on" steroids per course/cycle	N	%
6-12 week cycle	30	35.3%
12-16 week cycle	27	31.8%
Were on a specific cycle	19	22.4%
16-20 week cycle	9	10.6%
Average amount of weeks that an individual stayed "off" steroids between a course/cycle	N	%
12-18 weeks	16	18.8%
6-12 weeks	15	17.6%
Had an unique programme	15	17.6%
0-6 weeks	14	16.5%
18-24 weeks	11	12.9%
Other	14	16.6%
The average amount of time that steroids were used a year	N	%
Twice a year	23	28.2%
Once a year	18	21.2%
Continuously throughout the year	17	20%
Other	24	30.6%
Used more than one steroid per cycle (i.e. stacking)	N	%
Have used more than one steroid in combination	75	88.2%
Have only used one steroid during a course	10	11.8%

Poster

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Small Scale Research and Impact

Summary of Service-Related Research and associated Impact (SSRI)

Trainee(s)	Supervisor(s)	Placement	Cohort	Date Completed
Harry Ager	Dr Graham Evans	FPB	2012	May 2013

Research background and context

The Essen Climate Evaluation Schema (EssenCES: Schalast, Redies, Collins, Stacey & Howells, 2008) is a short questionnaire developed for assessing therapeutic atmosphere of forensic psychiatric wards. The social climate of psychiatric wards is an essential factor which influences patients, wellbeing and treatment outcomes. Research shows that a supportive atmosphere is important for successful treatment and therefore it is necessary to assess that there is this provision. The following results have been obtained after asking patients and staff from a low secure unit to fill in the EssenCES questionnaire. The report compares the results of both staff and patients in May 2013. These results were fed back to both the patients and staff and action plans will be formulated and implemented.

Research aims

The secure unit requested that a survey be conducted in order to improve the climate of the ward for both service users and staff. Therefore, in response to this request, the author examined data collected from the EssenCES questionnaire to evaluate effectiveness of the ward climate for both the service-users and staff.

What the research discovered

Results: A total of 14 (7 service users and 7 staff) from the secure unit completed the questionnaire. This number seems appropriate to interpret the results as representative of the group of patients living and staff working at the secure unit. The guidelines indicate that 7-10 persons for each category provide a good basis for characterising the ward's climate.

The data obtained in this survey suggests that service users and staff scored differently among all three sub-scales. 1: represents '*Patients 'Cohesion and Mutual Support'*' (PC) (whether mutual support of a kind typically seen as characteristic of therapeutic communities is present). 2: '*Experienced Safety*' (ES) (the level of perceived tension and threat of aggression and violence); and finally 3: '*Therapeutic Hold*' (TH) (the extent to which the climate is perceived as supportive of patients' therapeutic needs). High scores indicate a positive social climate.

'Patients 'Cohesion and Mutual Support': The secure unit scores for service users fall within the 'somewhat above average' range. Whereas, staff score were slightly higher and fall into the 'clearly above average' range when compared with people of similar psychiatric backgrounds. Equally important is the fact that both service users and staff interact with one another and is it unusual for staff to rate patient cohesion more highly than service users do.

'Experienced Safety': Service users on the secure unit responded significantly higher than the staff and scored this item within the 'somewhat above average' range when compared to people of similar psychiatric backgrounds. However, the staff fall within the 'somewhat below average' range compared with their comparison group. Therefore, the experienced safety is perceived as more positive and higher for service users when compared with the staff.

'Therapeutic Hold': The results reveal that the secure unit staff scored higher than the service users. Staff responses fell within the 'clearly above average' range, whereas, the service users scores were in the 'average' range. However, this is almost universally the case the studies that have utilised the EssenCES.

Discussion: Generally, it seems that the secure unit service users' scores ranged from 'average' to 'somewhat above average' range. These results reflect other experiences within inpatients forensic psychiatric units. Additionally, the staff scores are predominately within the 'clearly above average' range, however, it is important to note that staff are particularly concerned with their experiences of safety within the unit. This was reflected in their scores, which were within the 'somewhat below average' range when compared with similar forensic wards. Therefore, it may be beneficial to explore this further to improve staffs' perception of safety.

EssenCES is a questionnaire designed to explore the climate of wards. In this sense, the data seems to suggest that services users: (1) perceive the existence of a good therapeutic community, (2) the environment is not significantly threatening or hostile for them, and (3) the unit seems to allow the establishment of therapeutic relationships. The data appears to suggest that at this point in time, the climate of the secure unit may be perceived globally by the service users as one with the essential features to promote recovery and facilitate change. Therefore, the service users' have a perception of the service being conducive during their road to recovery - it is also felt that staff's perceptions are well reflected in this survey.

It is important for the ward climate to be conducive, so that the service users can be treated effectively. The results can be used as a baseline for future surveys to be conducted, to assess the effectiveness of the proposed action plan. Therefore, time and effort must be invested by both staff and service users to promote improvement to the ward climate. This will include encouraging open communication between staff and the service users to enable problems pertaining to living in a therapeutic community to be solved.

How the findings will be disseminated

These results of the evaluation were disseminated to both the secure units service users and staff in a report and oral format during on the 12th September 2013.

Service impact achieved by the research and future plans

The evaluation will provide an action plan to be implemented within the service as outlined below:

‘Patients Cohesion and Mutual Support’: The service users have a positive perception of cohesion and mutual support. We believe that group activities assist in developing communication and rapport between them. Therefore, investing resources in-group activities would be advantageous. The staff survey indicates that the team’s cohesion appears to be good, though it could be improved. For example, teambuilding exercises, training days and more staff support would assist staff in improving coordination, support and communication. The unit has undergone substantial changes to its management structure, which may have influenced the dynamics of the team and the culture. In order to help the team to absorb the changes it is advisable to promote unity, common values and aspirations. This may be achieved by the creation of a reflective practice group.

‘Experienced Safety’: Service users scored this factor under normal limits; however, the staff appear to be concerned about their safety. This could be related to staff shortages. The reasons for staff shortages remain unknown to the author and, therefore, require further exploration. Additionally, staff have reported struggling with the range of clinical and behavioural presentations, particularly by those service users with a diagnosis of personality disorder. Therefore, training for this clinical presentation may be advisable. Appropriate staffing levels are important to manage these issues and staff may benefit by being able to formulate the function of a service users behavioural presentation. For instance, when assessing the service users, staff could use therapeutic skills to explore their suitability and potential influences they have within the secure unit’s community (e.g., service users with complex presentations can be challenging to manage in an environment that is predominantly focused on psychotic presentations).

‘Therapeutic Hold’: Service users scored within the average limit, which indicates that they believe the ward climate is supportive of their therapeutic needs. However, in order to take them into the ‘above average’ range more community based group could take place. Notably, staff scored this item higher than service users and may have over-estimated the therapeutic engagement. Therefore, open dialogue needs to take place between them to identify the discrepancy and identify what are the most valued groups by the service user community. It is interesting to note that both staff and service users share the same perception that the ward climate is conducive to meeting the needs of the service users. This suggests that there is close working alliance between the staff and service users, which should be encouraged. One way for staff to develop and foster good therapeutic alliances and promote good communication is through peer support and reflective practice groups.

Reference

Schalast, N., Redies, M., Collins, M., Stacey, J. & Howells, K. (2008).
“EssenCES, a short
questionnaire for assessing the social climate of forensic psychiatric
wards”. *Criminal Behaviour and Mental Health*, 18(1), 49-58.

Trainee’s Signature: _____ **Date:** _____

Supervisor’s Signature: _____ **Date:** _____